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FLORA OF GUATEMALA

PART IX

FLORA OF GUATEMALA

PAUL C. STANDLEY

*Late Curator of the Herbarium
Field Museum of Natural History*

LOUIS O. WILLIAMS

*Chairman, Department of Botany
Field Museum of Natural History*

AND

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FIELDIANA: BOTANY

VOLUME 24, PART IX, NUMBERS 1-4

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AND
LOUIS O. WILLIAMS

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UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

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Managing Editor, Scientific Publications

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Flora of Guatemala - Part IX,* Number 3

LABIATAE. Mint Family.

PAUL C. STANLEY AND LOUIS O. WILLIAMS

References: George Bentham, *Labiatarum genera et species*, 1832-36. Carl Epling, *The Labiateae of the Yucatan Peninsula*, Carnegie Inst. Wash. Publ. 522: 227-245. 1940.

Herbs, shrubs, or rarely small trees, various in habit, the stems usually quadrangular, at least in herbaceous plants; leaves opposite, sessile or petiolate, narrow or broad, entire or dentate, rarely lobate or pinnatifid, aromatic or often strong-scented and conspicuously glandular-punctate, estipulate; inflorescence usually of dichasial or circinate cymes that form a whorl, often very dense and spike-like or head-like, or the flowers solitary in the axils of leaves; flowers perfect, zygomorphic or nearly actinomorphic (*Mentha*); calyx gamosepalus, often bilabiate, the 3 upper lobes more or less connate, often completely so, the 2 lower lobes usually distinct, often enlarged and chartaceous in fruit; corolla usually bilabiate, the dorsal lobes united to form an erect lip, this often galeiform and enclosing the stamens; stamens 2 or 4, usually didynamous with the anterior pair longer, included or exserted; the anthers parallel or divergent; style gynobasic, bifid at the apex; fruit usually composed of 4 nutlets, distinct or connate in pairs.

A large family of cosmopolitan distribution with some 200 genera and 3,000 to 4,000 species. The largest and finest genus of the family in Guatemala is *Salvia*, and there are literally thousands of acres of this genus in the western highlands. *Salvia* is usually at its best just at the end of the rainy season.

Only the following genera are represented in Central America.

Stamens only 2, sometimes accompanied by sterile filaments.

Plants cultivated shrubs with linear revolute leaves. *Rosmarinus*.

Plants never shrubs with linear revolute leaves.

Upper lip of the corolla very concave, often galeiform; herbs or shrubs. *Salvia*.

Upper lip of the corolla flat or nearly so.

Filaments curved; a dwarf perennial herb. *Hedeoma*.

Filaments straight; tall coarse herbs or erect or scandent shrubs. *Cunila*.

Stamens 4, all fertile.

Calyx with 2 entire lips, the upper one bearing an erect appendage, the calyx deciduous at maturity. *Scutellaria*.

Calyx not with 2 entire lips, the whole calyx persistent in fruit.

Calyx conspicuously bilabiate, the lips unequal.

*The research on Part IX of the "Flora of Guatemala" was made possible through generous grants from the National Science Foundation to Field Museum of Natural History, Louis O. Williams, principal investigator.

Upper lip of the calyx conspicuously decurrent on the tube.....	<i>Ocimum.</i>
Upper lip of the calyx not decurrent.	
Stamens usually twice as long as the corolla or longer; large coarse herbs or shrubs.....	<i>Catopheria.</i>
Stamens included or but little exceeding the corolla.	
Plants shrubs with very small leaves; cultivated plants.....	<i>Thymus.</i>
Plants herbaceous throughout.	
Plants cultivated; flowers in lax racemes.....	<i>Coleus.</i>
Plants native; flowers in short dense head-like spikes.....	<i>Prunella.</i>
Calyx with 5 subequal teeth, not obviously bilabiate.	
Lower lip of the corolla strongly saccate, the stamens declined along its surface.	
Nutlets cymbiform, the margin hyaline, lacerate; flowers capitate; herbs.....	<i>Marsypianthes.</i>
Nutlets ovoid, entire; flowers variously arranged; herbs or shrubs..	<i>Hyptis.</i>
Lower lip of the corolla plane or nearly so, at least not saccate.	
Calyx inflated in age, contracted at the mouth; herbs.....	<i>Teucrium.</i>
Calyx not inflated, sometimes enlarged in fruit with a broad open mouth.	
Leaves all or mostly deeply lobate; herbs.....	<i>Leonurus.</i>
Leaves not at all lobate.	
Flowers solitary in the axils of the upper leaves.	
Calyx much enlarged and thin in fruit, strongly venose; shrubs.....	<i>Chaunostoma.</i>
Calyx little enlarged in fruit or, if so, neither thin nor very conspicuously venose.....	<i>Satureja.</i>
Flowers verticillate, never solitary in the leaf axils, the verticiles often forming heads, spikes, or racemes.	
Corolla orange-red; flowers in globose head-like clusters 4-6 cm. in diameter.....	<i>Leonotis.</i>
Corolla never red or orange, usually white, pink, or purple; flowers never in large head-like clusters.	
Plants shrubs, woody throughout.....	<i>Hyptis.</i>
Plants herbaceous throughout.	
Stamens and styles short, included in the corolla tube (or not exserted from corolla).	
Inflorescences axillary verticels; flowers white; plants white-lanate.....	<i>Marrubium.</i>
Inflorescences terminal spikes or interrupted spikes; flowers purple or white; plants not lanate.....	<i>Lepechinia.</i>
Stamens and styles exserted from the corolla tube (and from the corolla).	
Upper lip of the corolla very concave and somewhat galeiform.....	<i>Stachys.</i>
Upper lip of the corolla flat or nearly so, not galeiform.	
<i>Mentha.</i>	

CATOPHERIA Bentham

Large coarse erect herbs or shrubs, the leaves large, thin, long-petiolate, dentate; inflorescence a long-pedunculate, globose or usually elongate, very dense spike, the flowers rather large, sessile, reflexed, the bracts shorter than the calyx; calyx bilabiate, membranaceous, ovoid or tubular, the posterior tooth large, ovate, its margins reflexed, scarcely or not at all decurrent, the lateral teeth united with the anterior ones into a lower, entire or 4-dentate lip; corolla tube slender below, scarcely exserted from the calyx, the throat broad, the limb bilabiate; posterior lip very broad, 4-dentate, the anterior lip narrow, entire, flat or slightly concave; stamens 4, didynamous, declinate, long-exserted, the filaments free; anthers confluent, 1-celled, in age explanate; disk annular, almost cupular, sinuate-dentate;

style stigmatose at the apex, subglobose-capitate; nutlets suborbicular, compressed, smooth, lustrous.

One other species is known, in Colombia.

Leaf blades gradually attenuate at the base, very sparsely short-villosulous on the upper surface; spikes 3-4 cm. long. *C. capitata*.
Leaf blades usually rounded or cordate at the base and abruptly decurrent upon the petiole, rather densely and finely scaberulous on the upper surface; spikes mostly 7-15 cm. long. *C. chiapensis*.

Catopheria capitata Benth. ex Hemsl. Biol. Cent. Am. Bot. 2: 541. 1882. *Orthosiphon capitatus* Benth. Labiat. 29. 1832.

Wet mixed forest, 500-1,000 m.; Alta Verapaz. British Honduras. Type collected by Sessé and Mociño, probably in southern Mexico.

An erect branched herb, the stems slender, short-villous; leaves long-petiolate, thin, oblong-ovate to narrowly lanceolate, mostly 10-13 cm. long and 2.5-5 cm. broad, acute to long-acuminate, gradually attenuate to the base, rather remotely serrate or crenate-dentate, very sparsely short-villosulous above, slightly paler beneath and puberulent or villosulous on the veins; flowers spikes on long slender naked peduncles, very dense, many-flowered, the spikes 3-4 cm. long, the lower flowers reflexed or spreading; lowest bracts colored, dilated at the base, abruptly contracted into a long linear acumen longer than the calyces, the spike comose above; calyx about 12 mm. long, tubular, finely and rather densely puberulent, the lower teeth setaceous at the apex; corolla 2.5 cm. long, the tube slender, glabrous; stamens long-exserted.

Two specimens of the original Sessé and Mociño material are in the herbarium of Field Museum but there is nothing to indicate their exact locality. The flowers appear to be brightly colored although no information is available concerning this.

Catopheria chiapensis Gray ex Benth. in Hook. Icon. 13: 14. 1877. *Linimento; bajlac ché* (Alta Verapaz, Quechí, fide Diesel-dorff); *milimento* (a corruption of *linimento*); *baxlak cé* (Quechí, fide Williams and Wilson).

Steep brushy hillsides, or about Cobán a common weed in gardens, 1,000-1,700 m.; Alta Verapaz; Chiquimula; Guatemala (Volcán de Pacaya); Huehuetenango (in cultivation but probably also wild there). Mexico (Chiapas); El Salvador; Honduras.

A stout herb or shrub 1-3 m. high, probably perennial but sometimes annual, simple or sparsely branched, the stems stout, somewhat 4-angulate, finely appressed-puberulent; leaves large, thin, ovate to broadly deltoid-ovate, 10-18 cm. long, 7-11 cm. broad, gradually or abruptly long-acuminate, rounded or subcordate at the base and narrowly and abruptly long-decurrent on the petiole, denticulate or subentire, rather densely and finely scaberulous above, paler beneath, densely tomentulose to puberulent or glabrate; flower spikes few, on long naked peduncles,



FIG. 48. *Catopheria chiapensis*. A, portion of plant, $\times \frac{1}{2}$; B, calyx, $\times 1\frac{1}{2}$; C, corolla with exserted stamens and style, $\times 1\frac{1}{2}$.

mostly 7–15 cm. long, 2.5 cm. thick, tapering above. The flowers very numerous, crowded; bracts subreniform, mostly as broad as long or broader, much shorter than the fruiting calyces; calyx densely puberulent or tomentulose, green, at anthesis 7 mm. long, in fruit much longer; corolla lilac and white, little longer than the calyx; filaments white, three times as long as the corolla or longer, the anthers lilac.

We have seen few plants of this species in bloom; apparently it flowers mostly during the wet months. It is a common weed in some of the gardens of Cobán and may be recognized readily by the strong odor that has suggested its local name of "linimento," somewhat suggestive of the commercial liniments. Dieseldorf reports that an extract of the plant is a local remedy for hoarseness, and that the leaves are bound on the forehead to relieve headache.

There may be some question whether *Catopheria chiapensis* is native or whether it has become established from cultivation. *Catopheria spicata* Benth. from Ecuador is a very similar species, according to the illustration, and the two may prove to be the same.

CHAUNOSTOMA Donnell Smith

Shrubs with stout branches, the pubescence mostly of close branched hairs. Leaves short-petiolate, large, narrow, finely crenate; inflorescences axillary, racemose, much shorter than the leaves, rather few-flowered, the pedicels opposite, bracteate and bibracteolate; calyx obpyramidal, several-nerved, bifid to the middle, the 5 lobes subequal, triangular, accrescent in age and conspicuously reticulate-veined; corolla small, the tube short-exserted, the posterior lip erect, with semi-orbicular lobes, the lateral lobes of the lower lip almost obsolete, the middle lobe spreading, concave, entire; stamens 4, didynamous, ascending, long-exserted, the anther cells divergent, confluent; style short-bifid at the apex, the lobes subulate, equal; nutlets oval, smooth.

The genus consists of a single rare species. Briquet considered it possibly a synonym of *Satureja*, but this seems unlikely.

Chaunostoma meciostandrum Donn.-Sm. Bot. Gaz. 20: 9, t. 3. 1895.

Mountain forest, 1,800–2,200 m. or probably even higher; Santa Rosa (type collected near Buena Vista, Heyde & Lux 4368); Sololá; Quiché. Mexico (Chiapas).

A stout shrub 2–2.5 m. high, stellate-tomentose almost throughout, the branches densely leafy; leaves rather thick, on stout petioles 1–2 cm. long, elliptic-oblong or lance-oblong, 9–15 cm. long, 2–5 cm. broad, acute or attenuate-acuminate, rounded or obtuse at the base, closely and finely crenate, somewhat rugose, green and stellate-puberulent on the upper surface, pale and usually very densely appressed-tomentose beneath, with numerous minute golden glands on both surfaces; racemes few-flowered, less than half as long as the leaves, the bracts and



FIG. 49. *Chaunostoma meciostandrum*. A, habit, about $\frac{1}{2}$ natural size; B, corollas from side and dissected, about natural size; C, anther much enlarged; D, calyx dissected to show pistil, $\times 1$; E, nutlets in natural position and a nutlet enlarged about $\times 7$. From original published in *Botanical Gazette* 20: t. 3. 1895, with permission of University of Chicago Press. C. E. Faxton, del.

bractlets linear; flowers blue, the calyx blue, 8 mm. long, much accrescent in fruit and as much as 2 cm. long, puberulent or glabrate; corolla puberulent and yellow-punctuate, 15 mm. long; stamens twice as long as the corolla, declinate and contorted in age, the anther cells oblong, blue; nutlets black, lustrous, 2 mm. long.

The plant seems to be rare in Guatemala. We have found it but once, and then in sterile condition. The foliage is highly distinctive and the plant may be recognized readily by the leaves alone.

COLEUS Loureiro. *Coleus*

Herbs or low shrubs, usually with somewhat succulent foliage; leaves petiolate, broad, dentate, crenate, or incised; flowers small, blue or lilac, the verticillate clusters forming terminal spikes or racemes; calyx campanulate, 5-dentate, de-clinate in age; corolla bilabiate, the lower lip elongate, concave, entire, the posterior lip with 3-4 obtuse lobes, the tube exserted, decurved, the throat slender or am-plyate; stamens 4, didynamous, declinate, the filaments connate below into a short tube free from the corolla; anthers confluent, 1-celled, finally explanate; nutlets ovoid or broader, smooth.

Species 60 or more, native in the tropics of Africa and Asia.

Coleus blumei Benth. Labiat. 56. 1832. *Pompolluda; capa de rey; capa de reina; capa de reinita; hoja de color.* Native of the East Indies; cultivated in most parts of the earth as an ornamental plant; common in gardens of Guatemala and rarely escaping to waste or cultivated ground (Izabal, Suchitepéquez, Alta Verapaz, and doubt-less elsewhere), but probably not persisting.

An erect, usually much branched, somewhat succulent herb, usually a meter high or less; leaves variable in outline, petiolate, ovate to rounded-ovate, 6-15 cm. long, crenate, dentate, or variously incised, sometimes crispat, green to dark purple, red, brown, or mottled, acute or acuminate, puberulent or almost glabrous; flower clusters lax, forming long usually branched, almost naked racemes, the pedicels 1.5-2.5 mm. long; calyx 2-4 mm. long, glabrate, reticulate-veined, conspicuously gland-dotted; corolla blue to almost white, the tube longer than the calyx.

Sometimes called "manta de la reina" in Honduras. One of the common ornamental garden plants of Guatemala, frequently grown in pots, especially in the colder regions. Probably also in cultivation is *C. amboinicus* Lour., in which the flowers are sessile and the leaves tomentose beneath. There are innumerable varieties in cultivation in Guatemala, as in most other regions where the plants are grown. In the United States the various species of *Coleus* are favorite pot plants because of their variously colored leaves. This species was once reported from Guatemala as *Perilla ocyoides* L., on the basis of Tuerckheim 8265 from Alta Verapaz.

CUNILA L.

Herbs or shrubs, sometimes subscandent, the branches slender; leaves usually rather small; inflorescence corymbose or in terminal spikes or heads, sometimes axillary, the flowers small, usually white; calyx ovoid-tubular, 13(-10)-nerved, sym-metric, 5-dentate, the throat villous within; corolla tube equaling or slightly exceeding the calyx; limb bilabiate, the posterior lip erect, almost flat, generally emarginate, the anterior lip spreading, trifid, the lobes subequal and entire or the middle one larger and emarginate; stamens 2, anterior, erect, exserted, distant, the

filaments naked; anthers 2-celled, the cells distinct, parallel or finally divergent; style shortly bifid at the apex, the lobes subulate; nutlets ovoid or oblong, smooth.

Species about 15, all American, chiefly in the mountains of tropical and subtropical regions. Only one species is found in Central America.

Cunila polyantha Benth. Labiat. 362. 1834. *Chiclillo; crucita* (fide Aguilar); *inciensón de monte* (Jalapa).

Moist or wet thickets or mixed, rather open forest, often in forest of pine, oak, or *Cupressus*, 1,500–3,200 m.; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Southern Mexico; Honduras; Costa Rica; Panama.

An erect or slender shrub, or usually arching or scandent and sometimes several meters long, the stems stout or slender, the larger ones acutely 4-angulate, the branches usually divaricate or slightly reflexed, brown, pubescent; leaves short-petiolate, ovate, 2–5 cm. long, acute or acuminate, rounded at the base, serrate or almost entire, glabrate and deep green above, somewhat paler beneath, sparsely or rather densely villosulous, conspicuously glandular-punctate; flower clusters numerous, many-flowered, forming short or elongate spikes 1.5 cm. broad, the flowers on long slender pedicels; calyx green, almost 3 mm. long, sparsely pubescent, the teeth lance-subulate, acuminate; corolla white, 4 mm. long, long-hairy outside.

A very common and rather ornamental plant of the mountain forests of Guatemala, often forming dense tangles over other shrubs. The name "chiclillo" is given because of the resemblance of the strong odor of the plant to that of spearmint gum (chewing gum is known in Guatemala as *chicle*). In Honduras the plant is called "paleo."

HEDEOMA Persoon

Reference: Epling, Carl & Wm. S. Stewart, A revision of Hedeoma with a Review of Allied Genera, Fedde Repert. 115: 1–49, illus. 1939.

Low, annual or perennial herbs, sometimes frutescent, slender, branched, with leafy stems; leaves small, entire or dentate, the floral leaves like the lower ones or gradually smaller; flower clusters lax, few-flowered, axillary, or the upper ones approximate and forming a raceme, the flowers small, purple, lilac, or whitish; calyx tubular, 13-nerved, subterete, gibbous anteriorly at the base or subequal, bilabiate, the posterior lip tridentate, the anterior one bifid, or the calyx equally 5-dentate, the throat villous within, closed after anthesis; corolla tube equaling or longer than the calyx, slender, straight, naked within; corolla limb bilabiate, the posterior lip erect, flat, entire or shallowly bifid, the anterior lip spreading, trifid, its lobes subequal and flat or the middle one wider and sometimes emarginate;

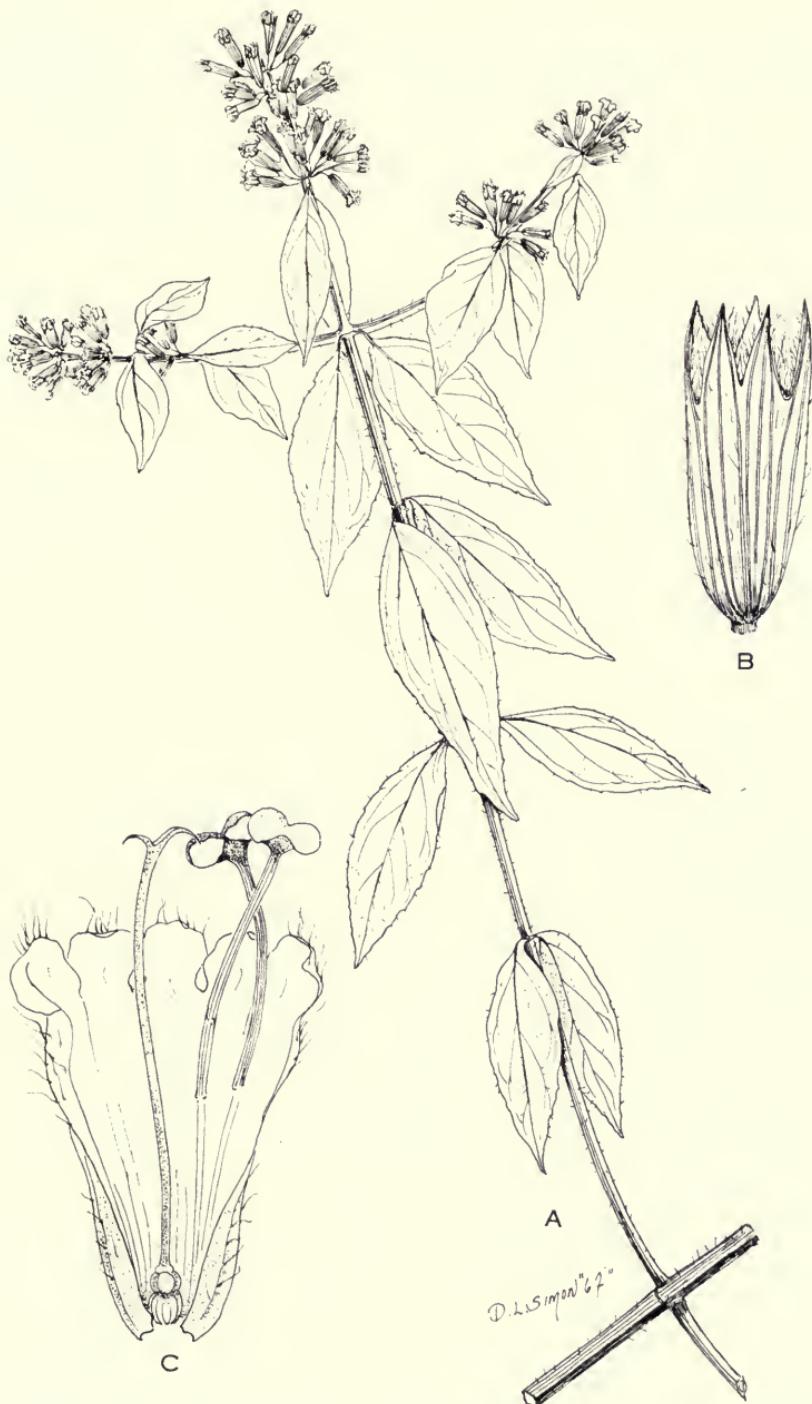


FIG. 50. *Cunila polyantha*. A, branch, $\times 1$; B, calyx, $\times 8$; C, corolla dissected showing stamens and pistil, $\times 8$.

perfect stamens 2, anterior, ascending under the posterior lip; anthers 2-celled, the cells divergent; style bifid at the apex, the lobes subequal, subulate; nutlets ovoid, smooth.

About 30 species, all American, mostly in Mexico and southwestern United States. The genus is known in Central America only by the collection mentioned below, and from which the illustration was prepared.

Hedeoma costatum Hemsl. Biol. Cent. Am. Bot. 2: 547. 1882.

At 1,400–1,600 m.; Huehuetenango (vicinity of Chaculá, Steyermark 51755). Mexico.

Plants perennial, erect or ascending, very slender, the stems simple or sparsely branched, 15–30 cm. long, densely pilose with spreading whitish hairs; leaves short-petiolate, rather thick and firm, rhombic-ovate to elliptic, mostly 7–20 mm. long, acute or obtuse, obtuse or rounded at the base, dentate, puberulent above, short-hirsute beneath, the nerves conspicuous beneath; inflorescences axillary, 1-few-flowered, often in cymules, flowers purple or lilac, 16–18 mm. long; calyx green, hispidulous, the teeth long, slender, subulate; corolla tube slender, long-exserted.

HYPTIS Jacquin

Reference: Carl Epling, Synopsis of the genus *Hyptis* in North America, Repert. Sp. Nov. 34: 73–130. 1933. Carl Epling, Revisión del género *Hyptis* (Labiatae), Rev. Museo de la Plata 7: 153–497. 1949.

Annual or perennial herbs or shrubs, various in habit; leaves usually dentate; flowers small, mostly purple or white, capitate, spicate, or variously paniculate; calyx ovoid, campanulate, or tubular, the 5 teeth subequal, acute or subulate, rarely short, the calyx in fruit usually accrescent, sometimes recurved; corolla tube cylindric or slightly ventricose, the throat slender or ampliate; corolla limb 5-lobate, somewhat bilabiate, the posterior lobes plane, erect or spreading, the lateral lobes similar, the anterior lip saccate, in anthesis abruptly deflexed, entire or emarginate; stamens 4, didynamous, declinate, the filaments free, naked; anthers confluent, 1-celled; style shortly bifid at the apex or subentire; nutlets ovoid or oblong, smooth or punctate-rugulose, rarely winged.

Species perhaps 300, all American and mostly Brazilian, a few of them naturalized as weeds in the Old World tropics. A few additional species are found in other parts of Central America.

Flowers sessile in globose heads, the heads pedunculate, usually axillary, rarely few at the ends of the branches, often subtended by an involucre of conspicuous bracts.

Flowers recurved in age..... *H. recurvata*.
Flowers not recurved.

Calyx teeth triangular or lanceolate, obtuse, acute, or deltoid-acuminate.



FIG. 51. *Hedeoma costatum*. A, habit of plant, $\times 1$; B, flower in natural position, $\times 2$. Davida Simon, del., 1967.

Plants herbaceous; leaves villous on the upper surface; calyx teeth subacute. *H. intermedia*.

Plants woody; leaves minutely puberulent to glabrate on the upper surface; calyx teeth acuminate. *H. scandens*.

Calyx teeth filiform or subulate and spinose.

Leaves linear-lanceolate, rarely broader, somewhat coriaceous and rigid; heads few, at or near the ends of branches, in fruit 2 cm. in diameter. *H. conferta*.

Leaves mostly ovate to broadly rhombic-ovate or lance-ovate, thin; heads few or numerous, all or mostly axillary along the branches.

Fruiting heads 1.5–2.5 cm. broad.

Calyx teeth hirsute; stems villous with long spreading hairs. *H. sinuata*.

Calyx teeth minutely puberulent; stems glabrous or sparsely puberulent. *H. capitata*.

Fruiting heads 1–1.5 cm. in diameter.

Bracts at the base of the heads ovate or elliptic, obtuse, villous-ciliate with long hairs. *H. atrorubens*.

Bracts at the base of the head subulate to lanceolate, acuminate or attenuate, not long-ciliate.

Peduncles mostly more than twice as long as the heads; leaves, at least the upper ones, sessile or nearly so. *H. lantanaefolia*.

Peduncles usually not exceeding the heads, often shorter; leaves conspicuously petiolate.

Leaves glabrous on the upper surface. *H. lanceolata*.

Leaves villosulous on the upper surface. *H. brevipes*.

Flowers variously arranged, not in globose heads or, if so, the heads sessile or the flowers conspicuously pedicellate, the flowers often cymose, or the clusters forming elongate spikes, the flowers rarely sessile and forming long dense spikes.

Flowers crowded and sessile in very dense, continuous, terminal spikes; plants annual. *H. americana*.

Flowers not in dense continuous terminal spikes; plants annual, perennial, or sometimes fruticose.

Calyx glabrous, the teeth short, triangular, obtuse; shrub. *H. verticillata*.

Calyx pubescent, the teeth subulate or spine-like; shrubs or usually herbs.

Fruiting calyx (below the teeth) 3–5 mm. broad; an annual. *H. suaveolens*.

Fruiting calyx 2 mm. broad or smaller.

Teeth of the calyx spreading; a shrub. *H. mociniana*.

Teeth of the calyx erect; herbs or shrubs.

Flower clusters borne on long slender peduncles longer than the clusters; plants herbaceous. *H. urticoides*.

Flower clusters sessile or on peduncles shorter than the clusters.

Inflorescences densely tomentose; leaves densely tomentose beneath; shrub. *H. oblongifolia*.

Inflorescence and leaves not tomentose; herbs.

Bracts at the base of the cymes ovate or oblong. *H. mutabilis*.

Bracts at the base of the cymes filiform. *H. pectinata*.

Hyptis americana (Aubl.) Urban, Fedde Rep. Sp. Nov. 15: 322. 1918; Williams, Field Mus. Bot. 34: 106. 1972. *Nepeta americana* Aubl. Hist. Pl. Guian. Fr. 2: 623. 1775. *Hyptis spicigera* Lam. Encycl. 3: 185. 1789.

Moist brushy slopes or open fields, sometimes in oak forest, 1,200 m. or less; Petén; Zacapa; Jutiapa. Central and southern Mexico;

British Honduras; Honduras; West Indies; South America; perhaps native of Brazil. Abundantly naturalized in Africa and elsewhere in the Old World.

An erect annual a meter high or usually lower, often much branched, the stems scabrous above, the hairs often aculeiform; leaves membranaceous, slender-petiolate, narrowly ovate or elliptic-ovate, 3-8 cm. long, acute or acuminate, cuneate and decurrent at the base, irregularly serrate, appearing glabrous but usually scaberulous on the veins; flowers white or purple, in very dense, slender spikes 4-8 cm. long and about 1.5 cm. thick; bracts linear, pectinate-ciliate, 3.5-4 mm. long; calyx tube at anthesis 1.5 mm. long, hispidulous, the teeth linear, erect, acute, almost 2 mm. long, the tube in fruit 5 mm. long; corolla tube 4 mm. long; nutlets smooth.

This common plant has been usually called *Hyptis spicigera* Lam. a name which was used by Dr. Epling, the most recent monographer of *Hyptis*. However, as the junior author has indicated there seems to be no reason for using that name instead of *H. americana* (Aubl.) Urban.

Hyptis atrorubens Poit. Ann. Mus. Hist. Nat. Paris 7: 466, *t. 27, f. 3.* 1806.

Moist or wet thickets, frequently in wet pine forest, sometimes in open swamps, 1,450 m. or less; Petén; Alta Verapaz; Izabal; Huehuetenango. Southern Mexico; British Honduras; Honduras; West Indies; South America.

Plants probably perennial, slender, sparsely branched, the stems procumbent or prostrate and often rooting at the nodes, 50 cm. long or less, villous-hirsute; leaves thin, on long slender petioles, ovate or elliptic, 1.5-4 cm. long, obtuse, rounded and abruptly decurrent at the base, crenate, thinly long-villous on both surfaces; heads 8-10 mm. in diameter, globose, on slender peduncles 1-2.5 cm. long in the axils of large leaves, the bracts ovate or elliptic, 4-6 mm. long, conspicuously venose, obtuse, hirsute-ciliate; calyx in anthesis 4 mm. long, the teeth equal, setaceous; calyx tube in fruit 4-4.5 mm. long, somewhat dilated, reticulate-veined, sparsely hirsute, the teeth hirsute; corolla white or greenish white, the tube 4-5 mm. long; nutlets ovate-rounded, alveolate.

Hyptis brevipes Poit. Ann. Mus. Hist. Nat. Paris 7: 465. 1806.
Chibolita.

Moist or wet fields or thickets, sometimes in rocky places or in oak forest, 1,200 m. or less; Izabal; Chiquimula; Jutiapa; San Marcos. Southern Mexico; Honduras; El Salvador; Costa Rica; Panama; West Indies; South America.

Plants annual, or perhaps sometimes more enduring, usually erect and 30-60 cm. high, sparsely or much branched, the stems hirsute with more or less appressed,

white hairs; leaves slender-petiolate, membranaceous, lanceolate to rhombic-ovate, mostly 4–6 cm. long, acute or acuminate, cuneately narrowed at the base and decurrent, irregularly and rather coarsely serrate, the teeth very unequal, rather thinly villous-hirsute on both surfaces; flowers white or purplish white, capitate, the heads globose, 10–12 mm. broad or sometimes larger, on peduncles 3–15 mm. long, the bracts lanceolate, spreading or reflexed, 4–6 mm. long, almost concealed by the flowers; calyx at anthesis 2.5–3 mm. long, the tube in fruit 2–3.5 mm. long, tubular, the teeth setaceous, spinose, erect, 1.5–2.5 mm. long, hispidulous; corolla tube 2.5–3 mm. long; nutlets smooth.

***Hyptis capitata* Jacq. Coll. Bot. 1: 102. 1786. *Pelotilla*.**

Moist or wet thickets or open fields, often along ditches, 1,200 m. or lower; Petén; Alta Verapaz; Izabal; Jutiapa; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu. Southern Mexico; British Honduras to El Salvador and Panama; West Indies; South America; naturalized in the Old World tropics.

Plants stout, erect, annual or perennial, a meter high or usually lower, branched, the stems glabrous below, more or less appressed-hirtellous above or glabrate; leaves slender-petiolate, membranaceous, ovate or lance-ovate, mostly 4–12 cm. long, acute or obtuse, somewhat rounded and abruptly decurrent to cuneate-attenuate at the base, coarsely and irregularly serrate or dentate, sparsely short-villous on the upper surface, inconspicuously puberulent beneath on the veins; flowers greenish white, capitate, the heads axillary, 2–2.5 cm. in diameter, on short or often much elongate peduncles; bracts ovate-lanceolate, 5–7 mm. long, conspicuous in early anthesis, concealed in age by the fruiting calyces; tube of the flowering calyx 1.5 mm. long, villous with long white hairs, the teeth setose-subulate, puberulent, the tube 8–10 mm. long in age, pilose-annulate within near the middle, the teeth 1.5 mm. long; corolla tube 2.5–3 mm. long; nutlets smooth.

Called "chibola" in El Salvador. A common weedy plant in many parts of the Central American tierra caliente.

***Hyptis conferta* Pohl ex Benth. Labiat. Gen. & Sp. 112. 1833.**
H. conferta var. *angustifolia* Benth. in DC. Prodr. 12: 112. 1848. *H. savannarum* Briq. Ann. Cons. Jard. Bot. Genève 2: 216. 1898. *H. jurgensenii* Briq. l.c. 219. *H. belizensis* Lundell, Contr. Univ. Mich. Herb. 8: 83. 1942 (type from Swasey Branch, Monkey River, Toledo District, British Honduras, P. H. Gentle 3896). *Amor seco de campo* (Petén).

In savannas or open bogs, 1,350 m. or less; Petén; Alta Verapaz; Izabal. British Honduras; Honduras; Nicaragua; Costa Rica; Panama; South America.

A stout stiff erect perennial herb, a meter high or less, simple or sparsely branched, the stems appressed-hispidulous; leaves thick and rigid, short-petiolate, mostly linear-lanceolate (in Central American forms), sometimes ovate-lanceolate,

6–10 cm. long, acute to attenuate at each end, decurrent almost or quite to the base of the petiole, serrate, scaberulous above or glabrate, appressed-hispidulous beneath along the veins or glabrate or sometimes densely and softly pubescent, the lateral nerves elevated and very conspicuous; flowers white, sessile in dense globose heads 2–2.5 cm. in diameter, the heads few, on long or short, stout, straight peduncles at the ends of the branches or in the upper leaf axils; bracts ovate-lanceolate, rigid, 7–8 mm. long, acute or acuminate, recurved in age; tube of the flowering calyx 2–2.5 mm. long, pilose, the teeth spinose-subulate, erect, the tube 5–6 mm. long in fruit, reticulate-veined, pilose-annulate within near the middle, the teeth 2.5–3.5 mm. long, scabrous; corolla tube 4–5.5 mm. long; nutlets smooth.

Called "cabeza de pollo" in Honduras. One of the most variable of the species of *Hyptis* and widely distributed. The Central American material is quite different from the Brazilian type but we follow Dr. Epling in his broad view of the species. A characteristic plant of the savannas of Central America.

Hyptis intermedia Epling, Bull. Torr. Bot. Club 67: 510. 1940.
Creolina silvestre (Huehuetenango); *catal* (Cobán, Quechí).

Moist or usually wet thickets, often in marshes, wet meadows, or open forest, sometimes on limestone, 1,650 m. or lower; endemic; Petén; Alta Verapaz (type from Saquijá, 43 km. northeast of Cobán on the Petén Highway, Standley 70195); Huehuetenango.

A tall perennial herb, 1.5 m. high or less, sparsely or copiously branched, the stems rather slender, green, thinly pilose with ascending or subappressed hairs; leaves deep green, short-petiolate or sessile, membranaceous, oblong-elliptic to ovate-elliptic or lance-oblong, mostly 5–10 cm. long, acute or obtuse, cuneate or acuminate at the base and decurrent nearly or quite to the base of the petiole, serrate, thinly villous on both surfaces; flowers white, in dense globose heads, these 10–12 mm. in diameter in fruit, smaller at anthesis, axillary, mostly on peduncles about 1 cm. long, much surpassed by the subtending leaves; bracts ovate-lanceolate or obovate, 3–4 mm. long or sometimes larger, obtuse or acute; calyx teeth 1.5–2 mm. long, narrowly deltoid, subacute, the tube in fruit 3 mm. long, sparsely pubescent, the teeth erect, greenish, glabrous or nearly so; corolla white, the tube 2.5 mm. long; nutlets obovate, scarcely 1 mm. long.

A common plant in wet situations in Alta Verapaz and some 15 collections of it have been made in recent years. In Huehuetenango a decoction of the leaves is administered to expel intestinal worms in human beings.

Hyptis lanceolata Poir. Encycl. Suppl. 3: 114. 1813.

Wet soil, at or little above sea level; Izabal. West Indies; northern South America; tropical Africa.

A coarse herb a meter high or less, rather sparsely branched, the stems appressed-hirtellous or almost glabrous; leaves membranaceous, slender-petiolate,

ovate-lanceolate or subrhombic, mostly 6–12 cm. long and 1.5–3 cm. broad, acute or acuminate, cuneate-attenuate at the base, irregularly serrate, glabrous or hirtellous beneath on the veins; flowers white, in dense globose heads 9–16 mm. broad, these axillary or in terminal leafy racemes, on peduncles 0.5–3 cm. long; bracts lanceolate, glabrate, 4–8 mm. long; calyx at anthesis 3 mm. long, tubular in age, the tube then 3.5–4 mm. long, almost glabrous, the teeth spinose-subulate, 1–1.5 mm. long, erect; corolla tube 2.5–3 mm. long; nutlets 1 mm. long, subacute.

Dr. Epling reports this species from Guatemala. We have not seen specimens and suspect that the plant does not occur. It is closely related to *H. brevipes* and may not be distinct from that species.

Hyptis lantanaefolia Poit. Ann. Mus. Hist. Nat. Paris 7: 468, t. 29, f. 1. 1806.

Dry pine forest, 1,000–1,300 m.; Huehuetenango (near Democracia, Steyermark 51085). Southern Mexico; British Honduras; Honduras; Nicaragua; Costa Rica; Panama; West Indies; South America.

Plants perennial, decumbent or prostrate, slender, the stems mostly 50 cm. long or less, sparsely branched, sometimes rooting at the nodes, appressed-pilose or glabrate; leaves short-petiolate or sessile, small, ovate or elliptic, mostly 1.5–3 cm. long, sometimes larger, obtuse or acute, rounded to cuneate at the base, crenate-serrate, scabrous or strigose on the upper surface, strigose, sericeous, or almost glabrous beneath; flowers white or pinkish, sessile in dense heads, these mostly about 1.5 cm. in diameter, axillary, the peduncles slender, usually much longer than the heads, sometimes 7 cm. long but usually shorter; bracts ovate or obovate, foliaceous, 5–8 mm. long, acute, sometimes serrate; calyx tube at anthesis 1.5–2.5 mm. long, pilose near the base, the teeth spinose-subulate, puberulent or glabrate, 1.5–3.5 mm. long, the tube in age 4–5 mm. long, pilose-annulate within near the middle; corolla tube 4 mm. long; nutlets smooth.

Hyptis mociniana Benth. Labiat. Gen. & Sp. 129. 1834. *Asterohyptis mociniana* Epling, Bull. Torr. Bot. Club 60: 19. 1932.

Moist or dry thickets, especially in pine-oak forest, often in hedges, 400–1,500 m.; El Progreso; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala. Central and southern Mexico; Honduras and El Salvador to Costa Rica.

A slender shrub 1–3 m. high, erect or usually with arching or recurved branches, brownish, densely pilose with short spreading hairs; leaves membranaceous, slender-petiolate, ovate or lance-ovate, 3–8 cm. long, acute or acuminate, rounded or subtruncate at the base, irregularly crenate-dentate, densely, finely, and softly

FIG. 52. *Hyptis mociniana*. A, branch, $\times 1$; B, branch to show variation, $\times 1$; C, flower from the side, $\times 8$; D, flower from the front, $\times 8$; E, corolla dissected, showing pistil and stamens, $\times 10$.



pubescent on both surfaces; flowers small, white, in dense and very numerous verticels, these forming very long, slender, dense or somewhat interrupted, leafy-bracted or almost naked spikes; calyx tube 1.2–1.5 mm. long at anthesis, densely pubescent, the teeth 2.5–3.5 mm. long, pectinate-ciliate, in age spreading or recurved, linear-subulate, spinose, the tube in age 1.5–2 mm. long; corolla tube 3 mm. long; nutlets minutely punctate-rugose.

Called "verbena montés" in El Salvador. This has been reported from Guatemala as *H. stellulata* Benth., a related species of Mexico.

Hyptis mutabilis (L. Rich.) Briq. Bull. Herb. Boiss. 4: 788. 1896. *Nepeta mutabilis* L. Rich. Act. Soc. Nat. Hist. Paris 1: 110. 1792. *H. spicata* Poit. Ann. Mus. Hist. Nat. Paris 7: 474, t. 28, f. 2. 1806. *H. polystachya* HBK. Nov. Gen. & Sp. 2: 321. 1817. *Gusanillo morado* (fide Morales); *mirto silvestre* (Retalhuleu); *raxsrukén* (Cobán, Quecchí).

Wet to dry thickets or fields or open forest, frequently in pine-oak forest, sometimes on rocky slopes, occasionally a weed in coffee plantations or other cultivated ground, 2,300 m. or lower, mostly at 1,200 m. or less; Alta Verapaz; El Progreso; Petén; Izabal; Zacapa; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Sololá; Quiché; Suchitepéquez; Retalhuleu; Huehuetenango; Quezaltenango; San Marcos. Mexico; Honduras and El Salvador to Panama; South America.

Plants herbaceous, erect, 1.5 m. high or less, often much branched, rather slender, the branches glabrous to villous; leaves membranaceous, on long slender petioles, ovate or rhombic-ovate, mostly 3–6 cm. long, acute or acuminate, rounded and abruptly decurrent or cuneate at the base, crenate-serrate, variously pubescent above, somewhat paler beneath, hirtellous to tomentose or rarely glabrate; flowers lavender or bright purple, in dense bracteate clusters, these arranged in dense or interrupted, leafy or naked spikes; bracts ovate or elliptic, acute or acuminate, conspicuous, prominently nerved, closely appressed; calyx tube narrow, in anthesis 1.5–2 mm. long, in fruit 4 mm. long, pubescent or glabrate above, villosulous near the base, reticulate-veined, the teeth setaceous, erect, 1 mm. long, scaberulous; corolla tube 3–4 mm. long.

Known in El Salvador by the names "orégano montés," "chan montés," and "Chichinguaste blanco," as well as "Carrizo" in Honduras; and "pozolillo" in Veracruz.

A very common weed in many parts of Guatemala, often forming large dense colonies. When in early flower the forms with bright purple corollas are rather showy and handsome but in age the plants are unattractive. The long, narrow fruiting calyx facilitates recognition of the species.

Hyptis oblongifolia Benth. in DC. Prodr. 12: 125. 1848.

Moist or dry thickets or open slopes, often in rocky places, frequently in pine-oak forest, 250–2,400 m., chiefly at the lower elevations; Jutiapa; Santa Rosa; Guatemala. Southern Mexico; Honduras; Nicaragua; Costa Rica; Panama.

An erect shrub of 1–2 m., sparsely or much branched, the branches rather slender, brown, densely tomentose with close matted hairs; leaves slender-petiolate, membranaceous, oblong to oblong-ovate, 5–9 cm. long, acute or acuminate, rounded to attenuate at the base, crenate-serrate, greenish on the upper surface but densely villosulous, pale or whitish beneath, very densely tomentose with close matted hairs; inflorescence very densely tomentose, the flowers white, in small dense short-pedunculate head-like clusters, these forming dense or interrupted, short or elongate, leafy or almost naked racemes, the racemes disposed in large panicles; bracts filiform, hidden under the wool of the heads; calyx densely pilose or tomentose, the tube broad, 2.5 mm. long, the teeth subulate, setiform, erect, 1.5 mm. long; corolla densely pubescent outside, the tube little exceeding the calyx teeth.

The plant is common in parts of eastern Guatemala, sometimes forming dense low thickets on exposed hillsides. It is especially plentiful in the vicinity of Jutiapa, and is one of the most common plants of the pine forests in central Honduras.

Hyptis pectinata (L.) Poit. Ann. Mus. Hist. Nat. Paris 7: 474, t. 30. 1806. *Nepeta pectinata* L. Sp. Pl. 799. 1753. *Orégano; changuala* (Jalapa); *canutillo hueco* (Jutiapa); *salada* (Petén).

Moist or dry, often rocky, brushy hillsides, open fields, pine-oak forest, sandbars along streams, or waste or cultivated ground, 1,900 m. or less; Petén; Alta Verapaz; Baja Verapaz; El Progreso; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; probably in all the lowland departments. Mexico; British Honduras to El Salvador and Panama; West Indies; South America.

An erect herb, probably annual, 1.5 meters high or less, often much branched, the stems usually densely pubescent or puberulent with decurved hairs; leaves slender-petiolate, mostly oblong-ovate to broadly ovate and 1–3.5 cm. long, obtuse or acute, rounded to subcordate or cuneate at the base, irregularly crenate-serrate, green above and sparsely or densely pubescent, paler beneath, densely pubescent or often whitish-tomentose; flowers white or pale purple, in small, very dense cymules, these usually secund, sessile or short-pedunculate, forming very long, dense or often interrupted, naked or leafy spikes, the spikes disposed in often large and much branched panicles; bracts setaceous; calyx tube in anthesis scarcely 1 mm. long, densely pubescent, the throat densely white-pilose, the tube in age 1.5–2.5 mm. long, the teeth filiform-subulate, erect, 1–1.5 mm. long; corolla tube 1.5 mm. long; nutlets smooth, black.

The Maya name of Yucatan is reported as "xoltexnuc." A common weedy plant of unattractive appearance, abundant in many regions of Guatemala as well as elsewhere in Central America.

Hyptis recurvata Poit. Ann. Mus. Hist. Nat. Paris 7: 467, *t. 28, f. 2.* 1806.

Moist or wet thickets or fields, 700 m. or less; Petén; Izabal; Escuintla; Retalhuleu. Southern Mexico; British Honduras; Nicaragua; Costa Rica; Panama; South America.

Plants annual or perennial, usually erect, a meter high or generally much lower, branched, the stems densely short-villous; leaves slender-petiolate, ovate or broadly ovate, membranaceous, 3-9 cm. long, acute, rounded and often cordate at the base or sometimes acute or attenuate, irregularly serrate, usually densely villous on both surfaces; flowers white, sessile in dense heads, these globose, 1-1.5 cm. in diameter, on slender peduncles 2-4 cm. long, axillary, sometimes forming long leafy racemes; bracts linear-setaceous, hidden by the recurved outer flowers; calyx in flower 3 mm. long, the tube pubescent or glabrate, the teeth setaceous, densely short-pilose, equaling the tube; corolla tube 5 mm. long.

Hyptis scandens Epling, Carnegie Inst. Wash. Publ. 522: 239. 1940.

Known only from the type, El Paso, Petén, in thicket, *C. L. Lundell* 4421.

A scandent shrub, the stems softly villous; leaves on petioles 3-10 mm. long, ovate, 2-3.5 cm. long, abruptly acute to acuminate, rounded at the base, irregularly serrulate, minutely puberulent to glabrate above, softly pubescent beneath; flowers in clusters of 6-12, these crowded in cylindric spikes 2-3 cm. long; bracts small, ovate; calyx tube cylindric in fruit, 4 mm. long, the mouth oblique, naked in the throat, the teeth small, weak, deltoid-acuminate, 0.5 mm. long.

Hyptis sinuata Pohl ex Benth. Labiat. 103. 1833. *H. capitata* f. *pilosa* Donn.-Sm. Enum. Pl. Guat. 3: 66. 1893. *H. guatemalensis* Vatke ex Donn.-Sm. Enum. Pl. Guat. 3: 66. 1893, as synonym. *H. sinuata* var. *borucaensis* Briq. Ann. Cons. Jard. Bot. Genéve 2: 228. 1898. *Chichín guchán* (fide Aguilar).

Moist or wet thickets or fields, often in bogs or marshes, frequently in ditches or along the edges of small streams, rarely in open rocky places, 1,900 m. or lower; Alta Verapaz; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Southern Mexico; Honduras; El Salvador; Nicaragua; Costa Rica; South America.

A coarse erect perennial herb, annual or perennial, usually erect, branched, the stems villous with coarse spreading hairs; leaves petiolate, membranaceous,

broadly ovate or rhombic-ovate, mostly 6–8 cm. long, obtuse or subacute, truncate or rounded and abruptly decurrent at the base, coarsely and unequally dentate or sometimes lobulate, usually copiously villous-hirsute on both surfaces; flowers white, sessile in dense globose heads about 2 cm. in diameter, these axillary, on stout peduncles 1–3 cm. long; bracts very conspicuous at anthesis, numerous, green, linear-lanceolate, 10–12 mm. long, villous-ciliate, attenuate; calyx tube in anthesis 2–2.5 mm. long, in fruit 4–7 mm. long, glabrous, reticulate-veined, the teeth setose-subulate, 1–2.5 mm. long, villous-hispid; corolla tube 4.5–6 mm. long.

A common plant of Guatemala, often abundant in very wet soil, weedy.

Hyptis suaveolens (L.) Poit. Ann. Mus. Hist. Nat. Paris 7: 472, t. 29, f. 2. 1806. *Ballota suaveolens* L. Syst. Nat. ed. 10. 1100. 1759. *Chichinguaste*; *turturitillo* (Jalapa); *salvia blanca* (Guatemala); *Chia*.

Wet to dry thickets and fields, often in hedges or waste ground, 1,600 m. or less; Petén; Alta Verapaz; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Suchitópequez; probably in all the lowland departments. Mexico; British Honduras to El Salvador and Panama; West Indies; South America; naturalized in the Old World tropics.

A coarse erect annual, usually much branched, sometimes 2 meters high but generally much lower, the stems hirsute with very long, spreading, white hairs; leaves membranaceous, slender-petiolate, mostly ovate or broadly ovate and 3–10 cm. long, acute or obtuse, rounded or somewhat cordate at the base, irregularly and unevenly dentate, usually hirsute and finely pubescent on both surfaces; flowers purple or white, generally in cymules of 3–5, these pedunculate in the leaf axils and forming leafy racemes or large panicles; calyx in flower 3–5 mm. long, villous or hirsute at the base, the teeth spinose-subulate, equaling the tube, the tube in age 5–7 mm. long, declinate on the pedicel, the teeth becoming rigid and somewhat spreading; corolla tube 4–6 mm. long; nutlets compressed, 2.5–4 mm. long, truncate or emarginate at the apex.

Called "orégano" in British Honduras; "confitura" (Yucatan); "xoltexnuuc" (Yucatan, Maya). The plant is often an abundant weed, sometimes forming dense thickets of considerable extent that are much visited by birds when the seeds are ripe. These "seeds" are employed in many parts of Central America like those of *Salvia hispanica*. They are larger than those of other *Hyptis* species and may be obtained in large quantities in places where the plants abound, by shaking the branches over a container. The plants often exhibit conspicuous color forms. The corollas usually are purple, and the leaves and stems frequently tinged with red or purple. In the same locality may be found other plants conspicuously different in appearance in which the corollas are white and the foliage pale green.

Hyptis urticoides HBK. Nov. Gen. & Sp. 2: 320. 1817. *H. lilacina* Cham. & Schlecht. Linnaea 5: 101. 1830. *Chinchigua* (fide Aguilar); *araña*; *orégano*.

Moist or dry thickets or open fields, frequently in pine-oak or open mixed forest, sometimes on sandbars along streams or a weed in cultivated ground; 400–2,400 m.; Alta Verapaz; El Progreso; Zacapa; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico; British Honduras; Honduras; Honduras; El Salvador; Nicaragua; Costa Rica; Panama.

An erect herb, probably perennial, 2 m. high or less, slender, often much branched, the stems densely puberulent with mostly decurved hairs, often also pilose below; leaves membranaceous, slender-petiolate, ovate or broadly ovate, commonly 3–8 cm. long, obtuse or acute, rounded at the base, irregularly serrate, short-villosulous on both surfaces or often pale-tomentose beneath; flowers white to purple, in small, lax or usually dense and head-like cymes, these on long slender axillary peduncles, forming elongate leafy racemes or usually large panicles; calyx in flower 2.5–3 mm. long, short-villous, the teeth subulate or filiform, 1–2.5 mm. long, erect or in age somewhat spreading, frequently unequal; corolla tube 3.5–4 mm. long; nutlets smooth.

A common plant in the Guatemalan mountains, often abundant and weedy. Epling has reported from Guatemala *H. sidaefolia* (L' Hér.) Briq., a South American species, separating it from *H. urticoides* on the basis of the length of the calyx teeth, an obviously variable and unreliable character. All material reported from Central America as *H. sidaefolia* probably can be referred quite satisfactorily to *H. urticoides*.

Hyptis verticillata Jacq. Icon. Pl. Rar. 1: t. 113. 1787. *Verbena*; *herba Martín* (Petén).

Wet to dry, often rocky thickets, 1,150 m. or less, mostly at low elevations; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; Santa Rosa; Guatemala (Fiscal). Mexico; British Honduras to El Salvador and Panama; West Indies; South America.

An erect shrub generally 1–2 m. high, usually densely branched, with ascending or erect, very leafy woody stems, the branches minutely puberulent or glabrate; leaves membranaceous, deep green, narrowly lanceolate to elliptic-lanceolate, 2–8 cm. long, acute to long-acuminate, acute or attenuate at the base, unevenly serrate, almost glabrous; flowers greenish white, small, in dense axillary clusters, short-pedicellate or almost sessile, forming very long, interrupted, leafy or almost naked spikes, these paniculate; bracts setaceous, small and inconspicuous; tube of the calyx 1 mm. long at anthesis, glabrous within and without, the teeth triangular, obtuse, slightly shorter than the tube, green, the calyx tube in fruit 2 mm. long, the

teeth connivent; corolla 3 mm. long; nutlets oblong, rounded-truncate at the apex, minutely reticulate.

Called "John Charles weed" in British Honduras; "barrehorno" in Honduras. Throughout Central America this plant is a favorite domestic "remedy" for innumerable ailments, and it is a special favorite with the people of West Indian origin on the Atlantic coast. In the Canal Zone it was formerly sold for medicinal purposes in the commissaries of the U. S. Government. W. A. Schipp reports that in British Honduras the crushed leaves are placed in hens' nests to drive away vermin, but more probably the insects collect on the leaves and then the leaves are removed and destroyed, a practice sometimes followed in Central America with some other plants.

Iboza riparia (Hochst.) N. E. Brown, a native of South Africa was cultivated in the Jardín Botánico of Guatemala. It is a much branched shrub 2-3 m. high with very fragrant foliage, small, petiolate crenate-dentate, densely pubescent leaves, and very numerous, long, slender spikes of small bright lilac flowers.

LEONOTIS R. Brown

Tall, annual or perennial herbs with leafy stems, sometimes shrubs; leaves long-petiolate, broad, dentate; inflorescence of densely flowered, remote axillary verticils, the flowers sessile or short-pedicellate, red or yellow; calyx 10-nerved, somewhat oblique, the teeth 8-10, unequal, pungent-tipped; corolla bilabiate, the tube ampliate above, curved, the upper lip rather long, erect, the lower lip trifid, the middle lobe scarcely longer than the lateral ones; stamens 4, didynamous, ascending; anthers 2-celled, the cells divergent; style branches unequal; nutlets tri-angulate, smooth.

About a dozen species, natives of Africa.

Leonotis nepetaefolia (L.) R. Brown in Ait. Hort. Kew. ed. 2. 3: 409. 1811. *Phlomis nepetaefolia* L. Sp. Pl. 586. 1753. Petén (La Libertad, *Mercedes Aguilar* 139).

Native in Africa, and widely but sparsely naturalized in tropical America; known from various parts of Mexico, but in Central America collected, so far as we know, only in Petén.

A coarse erect annual 2 m. high or usually lower, branched or simple, the stems obtusely quadrangular, densely puberulent; leaves on long slender petioles, thin, ovate or ovate-deltoid, 4-12 cm. long, acute or obtuse, subcordate to cuneate at the base, coarsely crenate, densely and finely pubescent or glabrate; flower clusters few, distant, subglobose, 4-6 cm. in diameter, very dense and many-flowered, the pedi-



FIG. 53. *Leonotis nepetaefolia*. A, sterile branch to show leaves, $\times \frac{1}{2}$; B, portion of a mature flowering stem, $\times \frac{1}{2}$; C, flower in natural position, and the corolla dissected to show pistil and stamens, all $\times 4$; D, calyx in outline, $\times 1\frac{1}{2}$ and to left a mature seed, $\times 4$. *Leonurus sibiricus*. E, branch, $\times \frac{1}{2}$; F, dissected flower showing calyx with subtending bracts, dissected corolla with stamens, the pistil and diagram of nutlets, all $\times 4$; G, anthers much enlarged; H, corolla with stamens and style from below, $\times 2$.

cels 1-2 mm. long; calyx in fruit as much as 2 cm. long, densely puberulent, reticulate-veined, the 8 teeth very unequal, with long stout spinose tips; corolla scarlet or orange, 2-2.5 cm. long, villous-hirsute, the tube curved, the upper lip as long as the tube, the lower lip much shorter than the upper ones; nutlets 3 mm. long, acutely angulate.

LEONURUS L.

Erect, annual or perennial herbs, branched, leafy; leaves mostly incised-lobate, the lower ones broad and often palmately lobate, the middle and upper caudine ones gradually narrower and incised or coarsely dentate; inflorescence of dense few-many-flowered axillary verticils, usually remote, the bracts and bractlets subulate or setaceous; flowers pale red or white, sessile; calyx turbinate or tubular-campanulate, 5-nerved, the 5 teeth subequal, acute, often pungent; corolla tube generally shorter than the calyx, sometimes longer, naked within or obliquely somewhat pilose-annulate, ampliate in the throat; limb bilabiate, the posterior lip oblong, erect, entire, fornicate or almost flat, the anterior lip spreading, 5-fid, the lateral lobes oblong, the middle one obovate; stamens 4, didynamous, the anterior ones longer, ascending under the galea, equaling or slightly longer than the corolla tube; anthers 2-celled, the cells usually parallel; style bifid at the apex, the lobes subulate; nutlets triquetrous, truncate at the apex, smooth.

About 10 species, natives of Europe and Asia.

Leonurus sibiricus L. Sp. Pl. 584. 1753. *Incienso rojo* (fide Aguilar).

A weed in waste ground, along roadsides, or open fields, often in streets or about dwellings, 250-1,650 m.; Alta Verapaz; Jalapa; Santa Rosa; Escuintla; Guatemala. Native of Europe, but widely naturalized as a weed in many parts of tropical America; occurring in Central America from British Honduras to El Salvador and Costa Rica, mostly in mountain regions; Mexico.

A coarse erect herb, sometimes a meter high, usually not more than half as tall, branched, probably annual, the stems stout, obtusely quadrangular, the whole plant green but puberulent throughout, the fine hairs of the stem mostly retrorse; leaves on long slender petioles, mostly 3-6 cm. long, truncate or cuneate at the base, the lowest ones 3-parted almost to the base, the segments again parted or lobate, the ultimate segments broad or almost linear, acute or acuminate; flower clusters much shorter than the leaves, densely many-flowered; calyx campanulate 6 mm. long, minutely puberulent or glabrous, somewhat reticulate-veined, the calyx teeth erect, spine-tipped; corolla purple-red, 8-12 mm. long, puberulent outside, the tube naked within.

This is not a very common plant in Guatemala but it is rather widely distributed, occurring usually as scattered plants along streets or roads or in waste ground.

LEPECHINIA Willdenow

Mostly low perennial herbs (in Central America), sometimes shrubs; leaves mostly medium-sized, broad or narrow, the pubescence often of branched hairs; inflorescence of flower clusters usually forming dense terminal or interrupted spikes; calyx campanulate, often somewhat bilabiate, the 3 posterior teeth generally connate below, the 2 anterior ones free or connate, all the teeth subequal, muticous or acuminate and often with spinose tips, the calyx tube somewhat crescent in age, often strongly so; corolla tube cylindric or campanulate, annulate within at the base or bearing a ring of short hairs, the lips short, subequal, the middle lobe of the lower lip much longer than the lateral ones; stamens inserted at the middle of the corolla tube or higher, often included in the tube; style branches plane, acute; nutlets obovate, smooth, black.

About 30 species, one in the Hawaiian Islands, the others American, mostly in the mountains of tropical or subtropical regions. One other Central American species is found in Costa Rica.

Inflorescence very dense and spike-like; stems puberulent or short-pilose above; calyx sparsely pubescent or in age often almost glabrous. *L. caulescens*.

Inflorescence of interrupted verticils of flowers; stems densely hirsute with long spreading hairs; calyx densely pubescent. *L. schiedeana*.

Lepechinia caulescens (Ortega) Epling, Repert. Sp. Nov. Beih. 85: 20. 1935. *Horminium caulescens* Ortega, Hort. Matr. Dec. 63. 1800. *L. spicata* Willd. Hort. Berol. 21, t. 21. 1816. *Bretónica*.

Moist or dry thickets or open, often rocky hillsides, frequently in pine-oak forest, 1,800–3,000 m.; Chimaltenango; Sololá; Huehuetenango; Totonicapán; Quezaltenango. Central and southern Mexico.

Plants perennial, usually with numerous radical leaves, the stems solitary or several, stout, erect, mostly 30–50 cm. high, simple or sparsely branched, puberulent or short-pilose, some or all of the hairs branched; radical leaves long-petiolate, oblong to ovate-oblong, 4–14 cm. long, obtuse, rounded to truncate at the base, sometimes subhastate, closely crenate-dentate, densely whitish-pubescent to glabrate on both surfaces, densely glandular-punctate beneath; cauline leaves similar, few or numerous, the upper ones short-petiolate, or sessile, acute, often cuneate at the base, usually less pubescent than the basal ones; flower spikes terminal, 2–5 cm. long, as much as 2.5 cm. broad, very dense and many-flowered, the bracts foliaceous, broadly ovate, the lowest somewhat exceeding the flowers, caudate-acuminate; calyx in fruit about 12 mm. long, usually glabrate, conspicuously reticulate-veined, the large teeth tipped with long stiff spines; corolla whitish, about equaling the calyx.

This is much less common in Guatemala than the following species; but it is plentiful in some localities and at times forms large dense colonies. It is employed, like most other aromatic plants, in domestic medicine.



FIG. 54. *Lepechinia schiedeana*. A, plant, $\times \frac{1}{2}$; B, calyx, $\times 5$; C, corolla dissected with stamens and pistil, $\times 5$.

Lepechinia schiedeana (Schlecht.) Vatke, Verh. Bot. Ver. Brandenb. 36. 1875. *Stachys schiedeana* Schlecht. Linnaea 7: 398. 1832. *L. procumbens* Benth. Labiat. 415. 1834. *Bretónica*.

Moist to dry meadows, pine, oak, or *Juniperus* forest, or open rocky hillsides or pastures, 1,600–3,800 m., most frequent at high elevations; Guatemala; Chimaltenango; Quiché; Huehuetenango; Totonicapán; Quezaltenango; Sololá; San Marcos. Central and southern Mexico. Perhaps also in Costa Rica.

A low perennial, generally 30 cm. high or less, with usually numerous basal leaves, the stems commonly several, stout, pilose or hirsute with long spreading white hairs, erect or decumbent, mostly simple, the hairs usually all simple; basal and lower cauline leaves long-petiolate, the uppermost sessile or short-petiolate, oblong to ovate-oblong, mostly 4–6 cm. long, obtuse or rounded at the base, cordate to cuneate at the base, sometimes subhastate, crenate, usually densely villous with long white hairs, conspicuously reticulate-veined and often bullate; flower clusters few, remote, many-flowered, the flowers short-pedicellate, the lower bracts rounded-ovate, scarcely longer than the flowers; fruiting calyx about 12 mm. long, shorter in anthesis, reticulate-veined, densely pubescent, the teeth tipped with a long slender stiff spine; corolla purple or pale purple, usually shorter than the calyx teeth.

A very common plant at many places in the highlands, especially in pastures too heavily grazed by sheep. A decoction of the plant is administered by the Indians of Huehuetenango as a remedy for stomach ache, kidney infections, and other disturbances. In general appearance both these species suggest some members of the genus *Salvia*. *Lepechinia alpina* (Oerst.) Standley of Costa Rica may be a synonym.

MARRUBIUM L. Horehound

Perennial herbs, usually tomentose or lanate and whitish; leaves petiolate, rugose, dentate or incised; inflorescence axillary verticils, commonly dense and many-flowered, the bractlets subulate, the flowers small, white or purplish; calyx tubular, 5–10-nerved, the teeth 5–10, equal or the alternate ones smaller, generally pungent, erect or often spreading or recurved; corolla tube included in the calyx, naked or imperfectly pilose-annulate within; limb bilabiate, the posterior lip erect, almost flat or concave, entire or shallowly bifid, the anterior lip spreading, trifid, the middle lobe broader and emarginate; stamens 4, didynamous, the anterior ones longer, included in the corolla tube; anthers 2-celled, the cells divaricate, confluent; style bifid at the apex, the lobes short, obtuse; nutlets ovoid, smooth, obtuse.

About 30 species, all natives of the Old World.

Marrubium vulgare L. Sp. Pl. 583. 1753.

Dry open banks, about 2,550 m.; Totonicapán (near San Francisco El Alto, Standley 83131). Native of Europe and Asia, widely

naturalized as a weed in the United States, also in Mexico; unknown elsewhere in Central America.

Plants perennial, usually whitish and densely lanate throughout, generally erect and branched; leaves slender-petiolate or the upper ones sessile, rather thick, oval to broadly ovate or suborbicular, 1.5–4 cm. long, obtuse or rounded at the apex, rounded at the base, crenate, very rugose; flower clusters dense and many-flowered, 1.5 cm. in diameter, the flowers sessile or nearly so, white; calyx throat densely white-barbate, the teeth usually 10, spinose, recurved in age, uncinate at the apex, densely stellate-pubescent; corolla somewhat exceeding the calyx.

The Spanish name of the plant is "marrubio," but this is unknown in Central America unless in pharmacies. The plant has long been used in medicine, chiefly for treating colds. A kind of strong-flavored candy, given to children as a remedy for cold and cough, was formerly very common in the United States and may still be obtained. This plant is a common weed in some parts of Mexico, and it is somewhat remarkable that it has not become common in the regions of Guatemala over-grazed by sheep. The fruiting calyces with their hooked teeth adhere to the wool of sheep and in the United States the plant has been widely dispersed by this agency.

MARSYPIANTHES Martius

Erect or usually prostrate herbs, often with viscid pubescence; leaves small, ovate or elliptic, petiolate, dentate; flowers capitate, mostly solitary in the upper leaf axils; calyx turbinate-campanulate, the 5 teeth equal, deltoid-lanceolate, con-nivent after anthesis, erect-spreading in fruit, the throat naked; corolla tube straight, cylindric, about equaling the calyx; upper corolla lip bifid, the lower one trifid, the lateral lobes longer than the middle ones; stamens 4, the filaments free, naked, glabrous or pubescent, the posterior shorter than the anterior ones; style shortly bifid at the apex, the branches subcomplanate; nutlets hemispheric, concave ventrally, the margin membranaceous, strongly involute, fimbriate or lacerate.

Five species, in tropical America, all except the following confined to South America.

Marsypianthes chamaedrys (Vahl) Kuntze, Rev. Gen. 524. 1891. *Clinopodium chamaedrys* Vahl, Symb. Bot. 3: 77. 1794. *M. hyptoides* Mart. ex Benth. Labiat. 64. 1832. *M. arenosa* Brandegee, Univ. Calif. Publ. Bot. 10: 418. 1924 (type from Jalisco, Chiapas). *Melosa; hierba rosario; orégano silvestre.*

Wet to dry thickets, fields, or open banks, sometimes in rocky places, often a weed in waste or cultivated ground or along roadsides, 2,400 m. or less, more common at lower elevations; Petén; Alta Verapaz; El Progreso; Izabal; Zacapa; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; San Marcos; Quezaltenango;

Huehuetenango; doubtless in all the lowland departments. Mexico; British Honduras to El Salvador and Panama; West Indies; South America.

Plants very variable, usually perennial but sometimes annual, generally much branched, the branches prostrate and often forming mats, rarely erect, the stems slender, mostly 15–50 cm. long, densely viscid-villous; leaves on usually short, slender petioles, ovate to oblong-lanceolate or narrower, 1–4 cm. long, acute, rounded to acute at the base, dentate, copiously pubescent and usually more or less viscid-villous; inflorescences axillary, capitate, sessile to long-pedunculate, few-many-flowered, 1–2 cm. in diameter, viscid-villous; bracts linear or lance-linear; calyx usually 6–8 mm. long, densely pubescent, the teeth ovate to lanceolate; corolla usually purple, rarely white, the tube about equaling the calyx.

Called "sompopo" and "cabezona" in El Salvador. A very common weedy plant of the lowlands of Central America, and abundant in many parts of Guatemala. Although we can offer no constructive suggestions as to how it may be done, it is suspected that painstaking study of this plant may show that it is divisible into several distinct forms, varieties, or even species. It is exceedingly variable in many respects, especially habit, length of the peduncles, and size of flowers, and to some extent in pubescence and leaf shape. The leaves often are conspicuously colored with purple, while in some plants all the leaves are of a uniform pale green. The plant is by no means always a weed, but often grows in pine or oak forest, remote from inhabited regions.

MENTHA L. Mint

Mostly perennial herbs, usually with a strong and distinctive odor, erect or diffuse, the leaves opposite, dentate; inflorescences mostly many-flowered, all axillary and remote or often crowded in terminal, almost naked, short or elongate spikes, the floral leaves reduced to bracts, the bractlets generally small or obsolete; calyx campanulate or tubular, 10-nerved, equally 5-dentate or somewhat bilabiate, the throat naked or villous; corolla tube included in the calyx, the throat campanulate, the limb 4-fid, the lobes subequal or the posterior one broader or emarginate; stamens 4, equal, erect, distant, the filaments naked; anthers 2-celled, the cells parallel, distinct; style shortly bifid at the apex, the lobes equal, subulate; nutlets ovoid, smooth.

Species about 30, in the North Temperate zone. None are native in Central America but one is found in the mountains of Mexico.

Mentha citrata Ehrh. Beitr. 7: 150. 1792. *M. aquatica* var. *glabrata* Benth. in DC. Prodr. 12: 171. 1848. *Yerbabuena*; *hierbabuena*; *menta*; *hierbabuena colocha*; *hierbabuena colonia*; *alabra* (Soloma, Huehuetenango); *iskij* (Quecchi); *hierbabuena de comer*.



FIG. 55. *Marsypianthes chamaedrys*. A, plant natural size; B, mature flower in natural position, $\times 4$; C, flower in bud with calyx dissected, $\times 4$.

Native of Europe; planted commonly in Guatemalan gardens and often thoroughly naturalized about springs or along streamlets, as in Zacapa and San Marcos, at 2,100–2,700 m.

Plants perennial by leafy stolons, the stems weak, simple or sparsely branched, 30–50 cm. long, decumbent or ascending, sparsely pubescent or almost glabrous; leaves slender-petiolate, ovate to ovate-orbicular, mostly 3–5 cm. long, subacute to rounded at the apex, rounded at the base, acutely serrate, sparsely pubescent or almost glabrous, conspicuously gland-dotted beneath; flowers small, white, the verticils forming short terminal spikes; calyx glabrous, the teeth subulate, half as long as the tube or longer; corolla glabrous.

The proper name for the common "hierbabuena" of Central America is very uncertain, since the plant never blooms, so far as we know, and inflorescences are necessary for proper determination of the species. Mint is grown in almost every garden, for use in flavoring food of various kinds and for medicinal purposes. Small bunches of the fresh stems are offered for sale in the markets. It is stated commonly in Guatemala that the fresh leaves are eaten or an infusion of the plant is drunk by women, especially those of easy virtue, to prevent pregnancy. Several small settlements in Guatemala have received the name Hierbabuena. The Maya name "xakilxiu" is reported from Yucatan for this plant.

OCIMUM L. Basil

Annual or perennial suffrutescent herbs, or somewhat shrubby. Leaves usually long petiolate, subentire to (ours) usually serrate; inflorescence of terminal racemes or panicles, the flowers 4–10 in interrupted axillary clusters, small, usually white, subtending bracts leaf-like or none; calyx bilabiate, the upper lip rounded, broad, its margins decurrent on the tube, in age often concave and more or less recurved, the lateral lobes smaller, apiculate, the anterior ones longer, setaceous-acuminated, ascending-incurved, often closing the tube, the tube ovoid, often pilose-annulate within at the base; corolla bilabiate, the 4 posterior lobes subequal, connate, the anterior one rounded, spreading; stamens 4, the posterior ones often with appendaged filaments, the anterior ones longer, all the stamens declinate; style exserted, the branches flat, acute; nutlets obovate.

About 40 species, mostly of the Old World. Only one species is common in our region; one other, *O. basilicum* L. or perhaps *O. americanum* L., is occasionally cultivated; *O. gratissimum* L. is known from a single specimen in Panama.

Flowers almost sessile, on very short pedicels; calyx in fruit about 5 mm. long. *O. basilicum*.
Flowers long-pedicellate; calyx in fruit 7–8 mm. long. *O. micranthum*.

Ocimum basilicum L. Sp. Pl. 597. 1753. *Albahaca*.

Native of tropical Asia; not naturalized in Central America, so far as we know.

Plants annual or more enduring, sometimes suffrutescent below, usually densely branched, 50 cm. high or less, the stems glabrous or nearly so; leaves slender-petiolate, elliptic to ovate or oblong, 2-4 cm. long, obscurely dentate or entire, acute, acute or attenuate at the base, glabrous; inflorescence usually rather short, the verticils separated, the pedicels very short, recurved; calyx long-ciliate, in fruit 5 mm. long, the upper tooth broad, the 2 lateral ones ovate, the 2 lowest ones subulate; corolla 4-5 mm. long; upper filaments with a tooth-like appendage at the base.

The senior author of this work states (in ms.) that: "Basil is planted in Guatemalan gardens at most elevations." However, it is not known to the junior author from the country and no voucher specimens are available. This is the common basil of gardens and is used as a condiment and as a medicinal herb. It should be in Guatemala.

Ocimum micranthum Willd. Enum. Pl. 630. 1809. *O. guatemalense* Gandofer, Bull. Soc. Bot. France 65: 67. 1918. *Albaac* (Petén, Maya); *albahaca*; *albahaca de monte*; *herba de toro* (Huehuetenango); *albajaca silvestre*.

Moist to dry thickets or open fields, often on rocky hillsides or on gravel and sand bars along streams, 1,300 m. or less; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Huehuetenango; probably in all the lowland departments. Southern Florida; Mexico; British Honduras to El Salvador and Panama; West Indies; South America.

An erect annual, usually 50 cm. high or less, sparsely branched, the stems puberulent or glabrate; leaves thin, slender-petiolate, broadly ovate to oblong-ovate, 2-7 cm. long, acute, rounded to acute at the base, serrate or subentire, almost glabrous, densely and finely glandular-punctate, paler beneath; verticils of flowers numerous, separated, forming elongate paniculate racemes, the pedicels 4-7 mm. long, recurved; calyx 7-8 mm. long, green, puberulent or glabrate, the upper lip broad, concave, the lower of 4 narrow subulate-tipped lobes; corolla white, about 4 mm. long; filaments naked; nutlets 1 mm. long.

The Maya name of Yucatan is "cacaltun"; "barsley," "baisley" are used in British Honduras. This strong-scented plant is a common weed of the lowlands of Central America and is plentiful in the tierra caliente of Guatemala. It is used in cookery and is much used in domestic medicine for treating colds and stomach disturbances. The principal use of the plant, however, is as a remedy for the screw worms that sometimes parasitize the nasal passages of people in the



FIG. 56. *Ocimum micranthum*. A, habit of plant, $\times \frac{1}{2}$; B, detail of inflorescence, $\times 2$; C, flower at anthesis dissected to show detail, $\times 6$; D, fruiting calyx with one nutlet, $\times 4$.

tropics. The leaves are pulverized and placed inside the nose, after which it is said that the larvae emerge. A decoction of the plant also is used to kill the larvae. The plant is employed likewise in killing bots and similar organisms attacking cattle and horses.

PRUNELLA L.

Low perennial herbs, usually decumbent or prostrate; leaves petiolate, entire to dentate or pinnatifid, membranaceous, the floral leaves reduced to bracts; flowers small, purple or white, in 6-flowered verticils, these forming a dense oblong head-like terminal spike, the bracts broad, imbricate; calyx tubular-campanulate, subcompressed, 10-nerved, reticulate-veined, bilabiate; corolla tube exserted from the calyx, the limb bilabiate, the upper lip erect, entire, the lower one trilobate; stamens 4, didynamous, the anterior ones longer, ascending beneath the galea, the filaments bidenticulate at the apex, the lower tooth antheriferous; anthers approximate by pairs, 2-celled; style glabrous, bifid at the apex, the lobes subulate; nutlets ovoid or oblong, smooth.

About five species, in temperate regions of both hemispheres, in the tropics confined to the mountains. Only one is native in America.

Prunella vulgaris L. Sp. Pl. 600. 1753. *Flor de colmena* (fide Aguilar).

Moist or wet, mountain meadows, open banks, or thickets, sometimes in pine-oak or *Cupressus* forest, 1,350–3,500 m.; Alta Verapaz; Baja Verapaz; Chimaltenango; Quiché; Totonicapán; Huehuetenango; San Marcos. Canada and United States; Mexico; Costa Rica (naturalized); temperate Europe and Asia.

Plants pubescent or almost glabrous, the stems procumbent to erect, usually 30 cm. long or less, simple or sparsely branched; leaves slender-petiolate, ovate to oblong, mostly 3–8 cm. long, obtuse or subacute, rounded to acute at the base, entire to crenate or dentate; flower spikes sessile or short-pedunculate, 2–10 cm. long, very dense; bracts ovate-orbicular, rounded at the apex, ciliate, closely appressed, often tinged with purple; corolla purple, violet, or white, 8–12 mm. long, about twice as long as the calyx.

A common plant in the meadows of the higher mountains of Guatemala, often in alpine situations but also plentiful in some regions of relatively low elevations, as about Cobán. While there is little doubt that the plant is native in Guatemala, in some areas of the country it may have been naturalized from Europe. It has become thoroughly established in the high meadows of Costa Rica, where it was introduced with grass seed. In a paper by Fernald (Rhodora 15: 179. 1913) some 10 varieties and forms of *Prunella vulgaris* are recognized, and all the native American material is referred



FIG. 57. *Prunella vulgaris*. A, habit, $\times 1$; B, plant from high altitude, $\times 1$; C, calyx from above, $\times 8$; D, corolla from the side, $\times 8$.

to varieties of *P. vulgaris*. These minor categories are scarcely to be taken seriously.

ROSMARINUS L. Rosemary

Shrubs, more or less pale-tomentulose with branched hairs; leaves linear, coriaceous, sessile, entire, with strongly revolute margins; flowers white or bluish, few and crowded in short axillary racemes, opposite, subsessile, subtended by small bracts; calyx ovoid-campanulate, bilabiate, the posterior lip concave, minutely tridentate, the anterior one bifid, the throat naked; corolla tube exserted from the calyx, ampliate above; limb of the corolla bilabiate, the posterior lip erect, emarginate, the anterior one spreading, trifid; perfect stamens 2, anterior, ascending under the posterior lip of the corolla, the filaments with a small tooth-like appendage; anthers dimidiate; nutlets ovoid-globose, smooth.

The genus consists of a single species.

Rosmarinus officinalis L. Sp. Pl. 23. 1753. *Romero*.

Native of the Mediterranean region, cultivated in many parts of the earth; planted frequently in Guatemalan gardens at middle and high elevations.

A densely branched shrub a meter high or less, the branches brown, with shredded or exfoliating bark, very minutely puberulent or almost glabrous; leaves 1-3 cm. long, usually crowded, obtuse, glabrous or nearly so on the upper surface, minutely stellate-tomentulose beneath but the lower surface nearly or quite concealed by the revolute margins; racemes 2-3 cm. long; calyx 4-4.5 mm. long; corolla 10-12 mm. long.

The plant is celebrated for its strong sweet odor. In the United States it often is employed for scenting linen. It is grown rather commonly in the Guatemalan mountains and the dried leaves are to be found in almost every market. They are utilized for their odor and also are employed in domestic medicine.

SALVIA L. Salvia

References: M. L. Fernald, A synopsis of the Mexican and Central American species of *Salvia*, Proc. Am. Acad. 35: 489-556, (reprinted as Contr. Gray Herb. 19: 489-556.) 1900. Carl Epling, A revision of *Salvia*, subgenus *Calosphace*, Fedde Repert. Sp. Nov. Beih. 110: 1-388, *tt.*, *maps*. 1939.

Annual or perennial herbs or shrubs, various in habit, usually pubescent, the pubescence sometimes of branched hairs; leaves usually dentate, sometimes entire, the floral leaves generally greatly modified to bracts, persistent or deciduous; inflorescences usually spicate, racemose, or paniculate, the flowers sessile or short-pedicellate, verticils 2-many-flowered; flowers very small to large, white, blue, purple, or red; calyx ovoid, tubular, or campanulate, bilabiate, the posterior lip en-

tire or tridentate, the anterior one bifid, the throat naked; corolla tube included in the calyx or exserted, uniform in diameter or ventricose or ampliate above, naked or pilose-annulate within; limb of the corolla bilabiate, the posterior lip usually erect and concave, entire or emarginate, the anterior lip spreading, trifid, the middle lobe generally broader, entire, emarginate, or bifid; perfect stamens 2, anterior, the filaments short; anthers dimidiate; style shortly bifid at the apex, the lobes subulate, equal or unequal; nutlets ovoid-triquetrous or somewhat compressed, smooth.

About 900 species have been described, and almost 500 are known from America. They are widely distributed in both hemispheres, in temperate and tropical regions. In the tropics they are found chiefly in the mountains. In North America the species are by far most numerous in Mexico, but the genus is well represented in Guatemala, and a few species besides those listed here are known from other parts of Central America, mostly in Costa Rica and Panama.

The treatment of *Salvia* by Dr. Epling, cited above, includes the species known from Guatemala, except those described from the country or found there in the intervening 30 plus years. The monograph is satisfactory in most respects but its practical value is much reduced by the unfortunate form in which the keys appear, probably because of a desire to save space. The excessive division of the genus into often meaningless sections is not helpful, especially since synonymous species are sometimes found in different sections. The careful and highly satisfactory account by Prof. Fernald includes the majority of Guatemalan Salvias and will be found much more convenient for use.

Salvias are often quite abundant, especially in the western highlands where they are conspicuous and attractive toward the end of the rainy season and on into December and January. Many kinds of Compositae, more especially species of *Eupatorium* and *Stevia* are conspicuous in the same region at the same time.

Corolla scarlet or cardinal-red.

Inflorescence with large broad red bracts, these usually deciduous during anthesis but very conspicuous in bud.

Calyx densely villous; shrubs.....*S. wagneriana*.

Calyx puberulent or in age almost glabrous; herbs.....*S. splendens*.

Inflorescence with green or reddish bracts, these mostly narrow and inconspicuous.

Calyx glabrous or nearly so; leaves acute at the base.....*S. miniata*.

Calyx conspicuously pubescent or, if glabrate, the leaves cordate or rounded at the base.

Calyx small, in fruit only 5 mm. long, shorter in anthesis; plants herbaceous; leaf blades rounded to acute at the base.....*S. cinnabarinata*.

Calyx larger, in fruit 7-12 mm. long or often longer.

Calyx densely tomentose with matted hairs; a shrub; leaves usually very rugose or bullate, tomentose beneath.....*S. lasiantha*.

Calyx variously pubescent but not tomentose with matted hairs.

Leaves small, the blades mostly 1–2 cm. long, acute or obtuse at the base; shrub *S. microphylla*.

Leaves much larger or, if small, truncate or cordate at the base.

Calyx about 7 mm. long, short pilosulose or glandular-pilose with soft spreading hairs, the teeth all broad, merely acute or apiculate; plants herbaceous *S. coccinea*.

Calyx larger, not glandular-pilose with soft spreading hairs, the teeth often narrowly acuminate.

Leaf blades acutish, obtuse or narrowed to an obtuse tip, mostly 2–4 cm. long and almost as broad, rugose; flowers axillary or in very short racemes; plants woody throughout. *S. disjuncta*.

Leaf blades acuminate or acute, much longer; flowers mostly in elongate racemes.

Leaves narrowly elliptic to lanceolate, glabrous. *S. grandis*.

Leaves ovate to cordate, sparsely pubescent to tomentose or, if glabrous, then ovate.

Pubescence of the leaves wholly or chiefly of more or less branched hairs; leaves usually tomentose beneath.

S. karwinskii.

Pubescence of the leaves of simple hairs or none; leaves not tomentose beneath.

Tube of the corolla strongly ventricose. *S. holwayi* and var.

Tube of the corolla not ventricose.

One corolla lip at least 5 mm. long.

Leaves glabrous; each corolla lip about 5 mm. long.

S. subrubens.

Leaves pubescent, at least below; upper corolla lip 10–12 mm. long, lower one short or none.

S. excelsa.

Corolla lips 2.5–3 mm. long, subequal. *S. curtiflora*.

Corolla white, blue, purple, or violet.

Verticils of flowers subtended by conspicuous, colored or green, more or less persistent bracts, these rounded or reniform and usually as broad as long or broader.

Plants slender annuals; calyx densely hirsute. *S. hypoides*.

Plants perennial herbs or shrubs; calyx puberulent to glabrous.

Bracts subtending verticils denticulate; calyx about 3–5 mm. long. *S. fracta*.

Bracts subtending verticils not denticulate, calyx 5.5 mm. long or longer.

Calyx glandular pubescent. *S. rubiginosa*.

Calyx pubescent to nearly glabrous. *S. mocinnoi*.

Verticils of flowers subtended by usually inconspicuous green bracts, these often or usually early deciduous, never rounded or reniform.

Leaf blades conspicuously hastate-triangular, with acute or angulate basal lobes. *S. cacaliaefolia*.

Leaf blades not at all hastate, the basal lobes, if any, rounded.

Leaf blades linear, lanceolate, or lanceolate-ovate, acute to attenuate at the base.

Inflorescences axillary or on axillary shoots shorter than the leaves.

S. alariformis.

Inflorescences terminal and exceeding the leaves.

Calyx about 14 mm. long; shrub; corolla purple or reddish. *S. grandis*.

Calyx 5–8 mm. long; herbs; corolla blue.

Calyx densely tomentose. *S. farinacea*.

Calyx hispidulous or strigose.

Leaves linear, entire, about 2 mm. broad; inflorescence much interrupted. *S. leptophylla*.
 Leaves mostly lanceolate, about 10 mm. broad; inflorescence very dense and continuous, not interrupted. *S. lavanduloides*.
 Leaf blades all or mostly ovate or broadly ovate, usually cordate to very obtuse at the base.
 Corolla small, the tube usually 4-7 mm. long, the calyx proportionately small.
 Calyx glandular-pubescent.
 Mature calyx scarcely 3 mm. long, the lobes very obtuse, not spinulose-tipped. *S. occidentalis*.
 Mature calyx 3.5-7.5 mm. long, the lobes with spinulose tips.
 Stems and leaves finely puberulent or glabrate. *S. micrantha*.
 Stems and leaves hispidulous or short-hirsute. *S. misella*.
 Calyx without gland-tipped hairs.
 Inflorescence very dense and continuous, spike-like.
 Calyx in flower 7-8 mm. long, densely white pilose or tomentose. *S. hispanica*.
 Calyx in flower 3.5-5 mm. long, sparsely villous to nearly glabrous. *S. polystachya*.
 Inflorescence much interrupted, the verticils of flowers separated.
 Undersurface of leaves, rachis, and calyx tomentose. *S. areolata*.
 Undersurface of leaves sparsely pubescent, rachis, and calyx not tomentose, hispid to glabrous.
 Calyx hispidulous. *S. tiliaefolia*.
 Calyx glabrous or sparsely and very minutely puberulent.
 Mature calyx 7-8 mm. long. *S. tiliaefolia* var. *alvajaca*.
 Mature calyx scarcely 5 mm. long. *S. tiliaefolia* var. *albiflora*.
 Corolla larger, the tube usually 10-20 mm. long, with the calyx proportionately large.
 Plants shrubs, the stems woody almost throughout.
 Calyx pale, densely whitish or yellowish-tomentulose; leaves pale beneath, usually tomentose or densely pubescent.
 Bracts of the inflorescence lanceolate or ovate, large, persistent; pubescence of inflorescence whitish. *S. shannonii*.
 Bracts of inflorescence small and soon deciduous or none; pubescence of inflorescence yellowish. *S. lasiantha*.
 Calyx green, sparsely pubescent or almost glabrous; leaves green and glabrate beneath.
 Branches glabrous or practically so. *S. kellermanii*.
 Branches densely pilose with spreading hairs. *S. operiflora*.
 Plants herbaceous, the stems soft throughout.
 Plants scapiform, the leaves all near or at the base of the stem. *S. nana*.
 Plants with leafy stems.
 Leaves densely white-tomentose beneath, obtuse. *S. leucochlamys*.
 Leaves not white-tomentose beneath or, if rarely so, acuminate.
 Stems densely hirsute with long spreading white hairs. *S. urica*.
 Stems not densely hirsute.
 Verticils of flowers crowded in long, very dense spikes, the spikes often paniculate, often interrupted below but the verticils of the upper portion crowded; flowers blue or purple.
 Corolla tube only 7-8 mm. long. *S. polystachya*.
 Corolla tube 10-18 mm. long.
 Calyx at anthesis 4-6 mm. long. *S. purpurea*.
 Calyx at anthesis 8-10 mm. long.

Young branches densely tomentose; leaves densely tomentose beneath; calyx tomentose. *S. areolata*.
 Young branches hirtellous with recurved or retrorse hairs or glabrate; leaves hirtellous to glabrous beneath; calyx hirtellous to glabrate.
 Young branches hirtellous with recurved or retrorse hairs; leaves hirtellous beneath; calyx hispidulous. *S. sparsiflora*.
 Young branches appressed hirtellous to glabrate; leaves short hirtellous to glabrous beneath; calyx nearly glabrous. *S. maxonii*.
 Verticils of flowers separated, forming lax and interrupted spikes or racemes.
 Calyx glabrous or hispidulous on the nerves only, glabrous between them.
 Calyx glabrous. *S. phaenostemma*.
 Calyx hispidulous on the nerves. *S. pansamalensis*.
 Calyx pubescent between or as well as on the nerves, the nerves sometimes weakly soft-pilose but not hispidulous.
 Calyx in fruit about 18 mm. long, deep blue, the upper lip rounded and cuspidate-mucronate. *S. recurva*.
 Calyx in fruit smaller, not deep blue, the upper lip gradually acute or acuminate.
 Leaf blades acute or cuneate-attenuate at the base, almost glabrous beneath but with minute appressed hairs along the nerves; calyx pilose with slender spreading gland-tipped hairs. *S. flaccida*.
 Leaf blades usually rounded or cordate at the base, mostly with obvious pubescence of spreading hairs beneath; pubescence of the calyx eglandular or of very short, glandular or often thick hairs.
 *S. gracilis*.

Salvia alariformis L. Wms., Fieldiana, Bot. 34: 108. 1972.

Broad-leaf or mixed forests, about 800 m.; Chiquimula. Honduras.

Shrubs to 2 m. tall, the branches terete, densely pilose with short erect segmented hairs, the internodes 2–5 cm. long. Leaves lanceolate to lanceolate-ovate, acuminate, serrate, sessile to short petiolate, tomentose or densely pilose below, sparsely pilose above, 3–9 cm. long, 1.5–3 cm. broad; inflorescences axillary or borne on short branches from axils of leaves, 1–4-flowered, shorter than or subequal to the subtending leaf; flowers blue, few; corolla bilabiate, tube about 15 mm. long, the lips subequal or the posterior one slightly longer, 9–10 mm. long, posterior lip galeate, pubescent outside, anterior lip trilobate, broad, slightly shorter than the posterior; calyx at anthesis about 7–8 mm. long, becoming to 12 mm. long post-anthesis, 11-nerved, the nerves sparsely pilose-hirsute with flattened hairs; anthers included in the galea; style bifurcate, one lobe much reduced.

Easily distinguished from other blue flowered species by the axillary inflorescences or the inflorescences borne on short axillary shoots.

Salvia areolata Epling, Bull. Torr. Bot. Club 71: 493. 1944.

Locally abundant on dry rocky slopes of the Sierra de los Cuchumatanes at 3,000–3,300 m. near Calaveras, Chemal, and El Mirador; Huehuetenango (type, Steyermark 50338). Endemic.

Shrubs 0.5–1 m. tall, the branches densely tomentose and hirsute. Leaves lanceolate-ovate to broadly ovate, acute or acuminate, serrulate, tomentose below and rufescent in age, softly hirsute to glabrous above, the young leaves rugose-areolate, the blades 3–10 cm. long and 1.5–4.5 cm. broad, the petioles mostly less than 1 cm. long but to 3.5 cm.; inflorescence an interrupted raceme to 20 cm. long, the flower clusters 1–2 cm. apart, the flowers 2–8 in each cluster; calyx 8–10 mm. long, the lips about 4 mm. long, hirtellous-tomentose, pedicels 4–8 mm. long; corolla purple or magenta, 10–12 mm. long, the tube as long as or slightly exceeding the calyx, slightly ventricose, the posterior lip galeate, tomentulose dorsally, about 4 mm. long, anterior lip trilobate, 3–4 mm. long.

Salvia cacaliaefolia Benth. in DC. Prodr. 12: 348. 1848. *S. atriplicifolia* Fernald, Proc. Am. Acad. 35: 553. 1900 (type from Chiapas). *S. hempsteadiana* Blake, Proc. Biol. Soc. Wash. 32: 197. 1919 (described from plants grown in Washington, D. C., originally from Purulhá, Baja Verapaz, Wilson Popenoe 176). *S. mendax* Epling, Fedde Rep. Sp. Nov. Beih. 110: 96. 1938 (type from Chichivac, Chimaltenango, Skutch).

Moist or dry mountain slopes, often in pine or oak forests, 1,500–2,400 m.; Alta Verapaz; Baja Verapaz; Jalapa; Chimaltenango; Huehuetenango; Zacapa; El Progreso. Mexico (Chiapas); Honduras.

An erect perennial herb, usually 50 cm. high, arising from a cluster of fleshy-thickened roots, the stems simple or sparsely branched, densely pilose with long spreading gland-tipped hairs; leaves on long slender petioles, thin, broadly deltoid-hastate, 5–15 cm. long, acute or obtuse, narrowly cordate at the base, the angles acute or obtuse, rather densely villous-pilose on both surfaces, the petioles 2–8 cm. long; inflorescence racemose, often paniculate, 10–25 cm. long, densely glandular-pilose, the flowers short-pedicellate, remote, solitary; calyx in anthesis green or blue, 4–10 mm. long, densely puberulent and glandular-pilose; corolla deep blue, the tube 16–22 mm. long, ampliate above, the lips subequal, about as long as the tube; stamens included in the galea at anthesis.

Salvia cinnabarinna Mart. & Gal. Bull. Acad. Brux. 11, pt. 2: 63. 1844. *Mielillo; coral; flor de burrión; terciopelo rojo.*

Wet to dry thickets or often in pine, oak, or *Cupressus* forest, 1,500–3,200 m.; El Progreso; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Southern Mexico; El Salvador; Honduras.



FIG. 58. *Salvia cinnabarina*. A, portion of plant in flower, $\times \frac{1}{2}$; B, calyx dissected showing one mature nutlet and one aborted, $\times 3$; C, nutlet, $\times 5$; D, corolla from the side showing exserted stamens and style, $\times 2$.

An erect branched herb, probably perennial, commonly about a meter high, sometimes taller, the stems slender, puberulent or tomentulose above with mostly appressed pubescence; leaves thin, on slender, long or short petioles, mostly oblong-ovate to lance-oblong, 5–18 cm. long, acuminate, rounded to broadly cuneate at the base, serrate, minutely puberulent or almost glabrous above, in age glabrate beneath but persistently puberulent on the nerves; verticils many-flowered, dense, forming slender, elongate, mostly naked spikes, the rachis densely glandular-pubescent and very viscid, like the calyces; bracts ovate-attenuate, deciduous, 1–2 cm. long; calyx at anthesis 3–4 mm. long, in age 5–6 mm. long, the upper lip abruptly contracted into a tail-like tip 2 mm. long; corolla bright red, the tube 15–25 mm. long, the upper lip 5–8 mm. long; stamens conspicuously exserted from the galea; style glabrous or sparsely pilose.

A very abundant plant in the central and western mountains, often forming dense clumps of considerable extent in open or brushy places, especially on banks by roadsides. When the plants first begin to bloom, during the rainy season, they are showy and rather handsome but they soon become ragged in appearance, the leaves become limp or brown, and the whole plant is unattractive in appearance. The flowers are easily separated from the spikes and adhere closely by their very viscid pubescence of the calyx to one's clothing, and often are annoying when one walks through colonies of the plants.

Salvia coccinea Juss. ex Murr. Comm. Goett. 1: 86, t. 1. 1778.
S. pseudococcinea Jacq. Coll. Bot. 2: 302. 1786. **S. coccinea** var. **pseudococcinea** Gray, Syn. Fl. 2, pt. 1: 368. 1878. *Tabaquillo* (Petén); *clavel* (British Honduras).

Moist or dry, open slopes or thickets, 200–1,200 m., perhaps higher; Petén; Alta Verapaz; Quiché; Huehuetenango. Southern United States; Mexico; British Honduras; El Salvador; West Indies; South America.

An annual or perennial herb, commonly 60 cm. high or less, usually erect and branched, the stems slender, puberulent and also hirsute with long spreading white hairs; leaves thin, slender-petiolate, 3–6 cm. long, obtuse, truncate or cordate at the base, finely crenate, densely and softly pubescent on both surfaces and usually sparsely hirsute; verticils with 3–6 or more numerous flowers, forming long or short, much interrupted racemes, the flowers slender-pedicellate; calyx green, in anthesis 7–8 mm. long, densely hirtellous with often gland-tipped hairs; corolla scarlet, the tube 13–20 mm. long, the upper lip 3.5–5 mm. long, the lower one twice as long; stamens exserted from the galea; style hirtellous.

The Maya name of Yucatan is recorded as "chaetzitz" ("chichinguaste rojo"—El Salvador). Epling gives the distribution of this species as "Ubique in America calidiore," which is far from being true. It has been found only in a few localities in Central America.

He states also that it is "presumably a native of Brazil." That may very well be the case, but there is no reason whatever for supposing that it is not native equally in Mexico and Central America rather than "introduced or naturalized" as he seemed to believe.

Salvia curtiflora Epling, Rep. Sp. Nov. Beih. 110: 340. 1939.
Salviamonte (fide Aguilar).

Moist or wet thickets or usually in dense mixed forest, sometimes in forest of *Cupressus* or *Alnus* or in thickets on white sand slopes, 1,500–3,200 m.; endemic, so far as known, but to be expected in Chiapas; Guatemala; Chimaltenango; Sololá; Totonicapán; Quiché; Quezaltenango (type collected somewhere between Quezaltenango and Colombia, *Skutch 1972*); San Marcos.

A coarse perennial herb 1–3 m. high, usually herbaceous throughout but rarely suffrutescent below, the stems thinly pilose or short-villous or usually glabrate; leaves on slender, often very long petioles, thin, ovate to rounded-ovate, 8–20 cm. long, acuminate, broadly rounded to very obtuse at the base, serrate or serrulate, thinly short-villous on both surfaces or sometimes densely villous beneath; flowers 6 or more in each verticil, short-pedicellate, forming usually long, dense or lax spikes 30 cm. long or shorter, the bracts caducous; calyx in anthesis 10–13 mm. long, densely hispidulous, green or purple; corolla deep red or purple-red, short-villous, the tube slender, 25–27 mm. long, the lips very short, subequal, 2.5–3 mm. long; style sparsely hirtellous.

An abundant species in western Guatemala. The plants are large and showy and at their prime rather handsome. They grow mostly in places where there is abundant moisture throughout the year.

Salvia disjuncta Fernald, Proc. Am. Acad. 35: 533. 1900.

Brushy or rocky slopes or ravines, sometimes on limestone, 2,300–3,300 m.; Sololá; Huehuetenango; Quezaltenango; San Marcos. Mexico (Chiapas).

A much branched shrub or woody vine, 0.6–4 m. tall, the branches suffrutescent, spreading pilose above, becoming glabrous, terete; leaves petiolate below, the upper ones nearly sessile, rather thick and rugose, cordate to ovate-cordate, acute or somewhat obtuse, crenulate, sparsely pilose-pubescent above, canescent-pilose below, 2–6 cm. long; inflorescence 1-few-flowered verticils in the axils of upper leaves; flowers carmine-red, showy; calyx pilose or glandular pilose on the nerves, 12–17 mm. long in anthesis, green or purple, the lobes triangular, acuminate, 5–8 mm. long; corolla with a broad, ventricose tube, 25–35 mm. long (in Guatemala), the lips subequal about 6–8 mm. long.

One of the less common of the red-flowered species and easily distinguished by flowers in leaf axils. Plants seen in the Cuchumatanes by the senior author were heavily grazed by goats.

Salvia excelsa Benth. in Lindl. Bot. Reg. 27: 90. 1841 (type from Guatemalan seed, *Hartweg*). *S. nervata* Mart. & Gal. Bull. Acad. Brux. 11, pt. 2: 77. 1844. *S. monocheila* Donn.-Sm. Bot. Gaz. 23: 13. 1897 (type from Huehuetenango, *Nelson 3635*). *Clarincillo; flor de burrión*.

In open to rather dense highland forests of oaks or gymnosperms, sometimes on sand slopes, 1,650–3,200 m. or perhaps higher; Chimaltenango; Sacatepéquez; Sololá; Huehuetenango; Totonicapán; Quetzaltenango; San Marcos. Southern Mexico.

A shrub of 1–2 m., often densely branched, rarely as much as 4.5 m. high, the branches pubescent or tomentulose with often brownish hairs; leaves thin, on long slender petioles, ovate, 5–10 cm. long, acuminate, often abruptly so, generally rounded at the base, crenate-serrate, short-villosulous or glabrate above, thinly or densely villous beneath, often tomentose and then pale; verticils 3–6 flowered, forming short or elongate, usually lax and interrupted, terminal or axillary racemes 20 cm. long or shorter, the flowers slender-pedicellate, the bracts caducous; calyx at anthesis 12–16 mm. long, sparsely or densely hirtellous and puberulent, the lips short and broad, apiculate, the margins densely white puberulent; corolla deep red, the tube 33–34 mm. long, ampliate, short-villous, the upper lip 8–10 mm. long, the lower one very short or almost obsolete; style glabrous.

A quite common and attractive plant of the highlands of western Guatemala, often pollinated by humming birds.

Salvia farinacea Benth. Lab. Gen. & Sp. 274. 1833.

Native of southwestern United States; northeastern Mexico; sometimes planted for ornament in Central America as in Petén (El Paso) and El Salvador.

An erect perennial herb a meter high or less, the stems slender, densely leafy below, naked above, finely puberulent and often whitish; leaves slender-petiolate, linear-lanceolate or lanceolate, 4–8 cm. long, obtuse or acute, acute or attenuate at the base, serrulate or subentire, puberulent or glabrate; verticils with 12 or more flowers, forming a long slender interrupted spike; calyx in anthesis 5–8 mm. long, densely white-tomentulose, the lobes very short, obtuse; corolla blue, the tube 6–9 mm. long, tomentulose, the upper lip 3–6 mm. long.

It would be of some interest to know how this plant, confined to a rather definite interior region of the southwestern United States, ever became introduced into cultivation in Central America.

Salvia flaccida Fernald, Proc. Am. Acad. 35: 509. 1900.

Wet forest, 800–1,300 m.; Alta Verapaz (type from Rubelcruz, *Tuerckheim 780*); Izabal (Cerro San Gil). Mexico (Chiapas).

A low slender perennial herb with creeping underground stems, the stems simple or sparsely branched, 15–40 cm. long, puberulent with minute recurved hairs,

short-villosulous above; leaves slender-petiolate, thin, elliptic-ovate or lance-ovate, 3–8 cm. long, acute, cuneate at the base, serrate, almost glabrous but appressed-puberulent beneath on the veins; verticils 3-flowered, forming short lax racemes 2–5 cm. long, slender-pedicellate, the rachis glandular-pilose, the bracts very small, green, persistent; calyx at anthesis 11 mm. long, glandular-pilose; corolla white and purplish, the tube 14–17 mm. long, the upper lip 5–6 mm. long, the lower one 8–9 mm. long.

Salvia fracta L. Wms. *Fieldiana Bot.* 34: 110. 1972.

Moist bank in wet mountain forest area, 1,800–2,400 m.; San Marcos. Endemic, (type, *Williams, Molina & Williams 26069*).

Small, weak, and fragile perennial herbs 30–60 cm. tall, stems simple or sparsely branched, quadrate and prominently angled, densely pilose with retrorse crisped hairs above, soon glabrate; leaves ovate to shallowly cordate, shallowly serrulate, acute or acuminate, sparsely pilose on both faces with appressed crisped hairs, the blade 1.5–3.5 cm. long and 1–3 cm. broad, petiole 1–1.5 cm. long, pilose; inflorescence a spike with 3–several verticils, compact or open, the verticils each with 8–12 flowers subtend with opposite persistent bracts, the bracts subreiniform, short acuminate, sessile, venose, serrulate, sparsely pilose outside, glabrous within, about 8 mm. long and as broad or slightly broader; flowers blue, very small; calyx campanulate-tubular, sparsely pilose along the nerves, trilobate, the lobes narrowly triangular, the dorsal about 0.7 mm. long, the laterals slightly longer, the tube 3–3.5 mm. long; corolla bilabiate, the tube 3–3.5 mm. long, the superior lip narrowly triangular, about 1 mm. long, the inferior lip about 2–2.5 mm. long, trilobulate, the lateral lobules minute and dentiform, the terminal lobule transversely oval, retuse, about 2–2.5 mm. broad; stamens 2, included, the anthers about 0.5 mm. long; style bifid; seeds not known.

Closely related to *Salvia mocinnoi* but with flowers half as large, the bracts subtending the verticils serrulate, leaves ovate or even shallowly cordate.

Salvia gracilis Benth. *Lab. Gen. & Sp.* 258. 1833. *S. membranacea* Benth. l.c. 259. *S. pseudogracilis* Epling, *Fedde Rep. Sp. Nov. Beih.* 110: 229. 1939 (type from Huehuetenango, *Nelson 3628*). *S. myriantha* Epling, l.c. 248 (type from Quezaltenango, *Skutch 1971*). *S. natalis* Epling, l.c. 265 (type from Huehuetenango, *Nelson 3625*). *Hierba del cáncer* (Huehuetenango, possibly an erroneous name).

Moist or wet mixed mountain forests, or thickets, often in the high coniferous forests and *Alnus* forests, 1,500–3,400 m.; El Progreso; Chimaltenango; Huehuetenango; Sololá; Totonicapán; Quiché; Quezaltenango; San Marcos. Southern Mexico; Costa Rica; Panama.

A perennial herb, usually erect and often much branched, sometimes 1.5 m. high but generally lower, the stems puberulent or pilose, sometimes glabrate; leaves long-petiolate, thin, ovate or rounded-ovate, 5–15 cm. long, acute to

abruptly acuminate, rounded or rarely subcordate at the base, crenate or serrate, usually short-villosulous on both surfaces, especially beneath; verticils with 3–12 or more flowers, forming lax or often dense spikes 15–40 cm. long, the rachis densely puberulent or glandular-puberulent, the pedicels generally short, the bracts caducous; calyx usually green or purple, at anthesis 5–8 mm. long, minutely glandular-puberulent and on the nerves short-hispidulous; corolla rose-purple or pale purple, rarely white, the tube 7–10 mm. long, not ventricose, the upper lip 3.5–5.5 mm. long.

Dr. Epling treated the five synonyms given above as distinct species and placed them in three different sections in his revision. We have examined well more than 100 collections of this plant, many determined by Epling, and are not convinced that there are characters to separate them.

Salvia grandis Epling, Bull. Torr. Bot. Club 71: 492. 1944.

Moist or mixed or pine forests, 2,000–2,600 m.; endemic; El Progreso (type, *Steyermark 43047*); Zacapa.

An erect or arching shrub 1.5–3 m. tall, the stems obscurely pubescent, becoming glabrous; leaves short-petiolate, narrowly elliptic or lanceolate, acuminate, attenuate to the base, serrate, glabrous, 8–15 cm. long, and 1.5–4 cm. broad; inflorescences few-flowered, interrupted spikes to 15 cm. long, flowers usually in groups of 3, the rachis ferruginous-puberulent; bracts thick, recurved or sigmoid, 1–3 cm. long, soon deciduous; calyx purple, the veins puberulent, the tube to 10 mm. long, the lips somewhat shorter, acuminate; corolla deep pink to rose-orchid, the tube 16–17 mm. long, ventricose, the lips subequal, about 6 mm. long, the upper one galeiform.

A distinctive species among its red-flowered allies because of the long, narrow, and glabrous leaves.

Salvia hispanica L. Sp. Pl. 25. 1753. *S. neohispanica* Briq. Ann. Cons. Jard. Bot. Genève 2: 137. 1898. *S. hispanica* var. *intonsa* Fernald, Proc. Am. Acad. 43: 63. 1907 (type from Buena Vista, Santa Rosa, *Heyde & Lux 440*). *Chía; chián; chan; chaaú*.

Moist or dry thickets or open, often rocky slopes or fields, sometimes on sandbars along streams, often a weed in cultivated or waste ground, sometimes in open oak forest, 1,150–2,500 m.; Alta Verapaz; Zacapa; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango. Central and southern Mexico; El Salvador (cultivated).

A rather stout, strict, erect annual, usually a meter high or less, simple or sparsely branched, the stems densely grayish-tomentulose or puberulent; leaves on slender, long or short petioles, ovate or oblong-ovate, mostly 5–8 cm. long, acuminate, rounded to acute at the base, serrate, densely pubescent on both surfaces, somewhat paler beneath; verticils with 6 or more flowers, forming very dense,

crowded spikes 5–25 cm. long and 1.5 cm. thick, the flowers very numerous, almost sessile; bracts ovate-acuminate, persistent; calyx in flower 7–8 mm. long, densely whitish-hirsute, in fruit 8–11 mm. long; corolla blue, the tube cylindric, 4.5–5.5 mm. long, the upper lip 3 mm. long, the lower 3.5–5 mm. long; style densely glandular at the base; nutlets oval, lustrous, 1.8 mm. long, smooth, mottled with black and gray.

This is one of the best known plants of Guatemala and Mexico, its seeds being known universally by the name "chía" or one of its variants, a word of Nahuatl origin. When the "seeds" or nutlets are soaked in water they swell somewhat after the manner of tapioca, developing a thick outer mucilaginous coat. When the soaked seeds are stirred or mashed in water, they form a beverage of agreeable flavor and mucilaginous consistency that is much drunk either at the table or at refreshment stands. It is sometimes offered on the table at hotels. The seeds contain 28–36 per cent of an oil which is yellowish and becomes lighter in color upon exposure to light. It is a drying oil and is used commonly in Guatemala as a paint dryer. In Mexico it is used by some of the Indians in painting *jícaras*—the cups made from *Crescentia* fruits—and probably it is utilized in the same manner in Guatemala. Martínez reports that in Mexico 1,000–3,000 kilos of the seeds may be produced per hectare. The flowers are much visited by bees. The place names Chiapa, Chiantla, Chiapas, and Chiapéc are derived from the name of this plant. *Caseríos* with the name El Chan exist in Guatemala in the departments of Guatemala and Santa Rosa.

There is little doubt that this plant is native in some regions of Guatemala but most of the seeds used locally are from cultivated plants, which apparently are of easy growth. Fields of the plant are of distinctive appearance, the plants usually standing close together. They lose their leaves as the seeds ripen, and the fields then look much like those of sesame (*Sesamum*). The seeds of some other species of *Salvia* and *Hyptis suaveolens* are used to prepare cooling drinks in the same manner as those of *Salvia hispanica*, but it is the seeds of the last that are most often employed for this purpose.

Salvia holwayi Blake, Proc. Biol. Soc. Wash. 33: 113. 1920 (type, Volcán de Agua, *Holway* 579); *S. popenoei* Blake, l. c. 114 (type, Tactic, Alta Verapaz, *Popenoe* 928). *Mielillo; castita blanca*.

Open slopes, thickets and mixed forest, often in pine-oak forests, 1,400–3,200 m., common at higher elevations and in flower often in great quantities in the western highlands at the end of the rainy sea-

son; Alta Verapaz; Baja Verapaz; Jalapa; Santa Rosa; Zacapa; Chimaltenango; Sacatepéquez; Totonicapán; Huehuetenango; Quiché; Quezaltenango; San Marcos. Southern Mexico.

Usually an erect herbaceous perennial 1.5 m. high or less, sometimes more elongate and reclining or subscandent, occasionally an erect shrub of 3–5 m., the branches brown, puberulent or glabrate or often hirtellous or short-pilose above and glandular-pubescent; leaves thin, slender-petiolate or the uppermost sessile, ovate or broadly ovate, 5–10 cm. long, acuminate, shallowly or deeply cordate at the base or the upper leaves rounded, serrulate, paler beneath, glabrous; flowers pedicellate, the verticils crowded or distant, forming thick spikes 20 cm. long or less, the rachis densely glandular-pubescent, the bracts caducous; calyx at anthesis 7–14 mm. long, usually green, densely glandular-puberulent and hispidulous; corolla usually cardinal-red or sometimes rose-red, the tube thick and ventricose, 20–23 mm. long.

One of the most attractive plants of the western highlands where it is found in flower in great abundance at the end of the rainy season. It is one of a complex made up of *S. wagneriana*, *S. excelsa*, *S. karwinskii*, and *S. curtiflora* that are not always easily distinguished.

Salvia holwayi var. **puberulenta** L. Wms. var. nov.

Open slopes, thickets and mixed forests, 1,650–3,200 m., found with the species in the western highlands; Chimaltenango; Sololá; Totonicapán; Quezaltenango (type, *Williams, Molina & Williams 25533*); San Marcos.

Differs from the typical variety in having leaves densely to sparsely puberulent.—A var. *holwayi* imprimis foliis dense aut sparsim pubescentibus differt.

Salvia hypoides Mart. & Gal. Bull. Acad. Brux. 11, 2: 74. 1844; L. Wms. Fieldiana, Bot. 34:111. 1972. *Clarín Saján* (fide Aguilar).

Moist or dry thickets or open, often rocky fields and hillsides, sometimes in open oak or pine forests, often an abundant weed in cultivated ground, especially corn fields, 200–2,500 m.; known from all departments of Guatemala. Mexico; British Honduras; Honduras and El Salvador to Panama; northern South America.

An erect annual, usually 25–60 cm. tall, simple or branched, the stems slender, pubescent; leaves on long slender petioles, thin, deltoid-ovate or rounded-ovate, 3–6 cm. long, acuminate to obtuse, truncate-rounded to obtuse at the base, serrulate, thinly villous on both surfaces; flowers densely glomerate, the glomerules many-flowered, globose, 12–15 mm. broad, separated or the upper ones close together, the bracts broadly rounded, 8–10 mm. broad, villous-hirsute, erose-denticulate; calyx at anthesis 3.5–4.5 mm. long, villous-hirsute with white hairs to subglabrous, slightly accrescent in age; corolla blue or pale blue, the tube 2.5–3.5 mm. long, the upper lip scarcely 1 mm. long, the lower one 2.5–4.5 mm. long.

A very common weedy plant in many parts of the mountains or even in the lowlands, found in abundance during the wet months but soon withering after the rains cease. Called "hierba de la reuma" in El Salvador.

It is doubtful if this plant is more than varietally distinct from the Mexican *Salvia lasiocephala* Hook. & Arn.

Salvia karwinskii Benth. Lab. Gen. & Sp. 725. 1835. *S. lindenii* Benth. in DC. Prodr. 12: 333. 1848 (type from Mexico, Chiapas). *S. siguatepequensis* Standl. Journ. Arnold Arb. 11: 40. 1930 (type from Siguatepeque, Honduras). *Mielero*; *Salvia sija*.

Moist mixed mountain forest, or usually in oak or pine forest, 1,500–2,800 m.; El Progreso; Chiquimula; Jalapa; Jutiapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quezaltenango; San Marcos. Southern Mexico; El Salvador; Honduras; Nicaragua.

A stout shrub of 1–4 m., woody almost throughout, rarely low and herbaceous, the pubescence of branched hairs, the stems rather densely and closely tomentose; leaves rather thick, on long or short petioles, ovate to lance-oblong, mostly 5–14 cm. long, acute or acuminate, rounded, or obtuse at the base, serrate, green above, sparsely villosulous, paler beneath, usually densely tomentose; verticils with 6 or more flowers, forming long, interrupted or rather dense racemes, the flowers on long or short pedicels, the bracts caducous, caudate-acuminate, the rachis densely viscid-vilosulous; calyx in bud long-caudate, usually reddish, at anthesis 12–15 mm. long, viscid-puberulent or villosulous and very shortly hispidulous, in bud appearing verruculose because of the unequal pubescence; pedicels mostly 10–15 mm. long; corolla bright red, rose-red, or scarlet, the tube 19–25 mm. long, villosulous.

A showy and handsome plant because of the abundant, large, and brightly colored flowers. It is an abundant and often quite variable species in the high mountains of western Guatemala. The less pubescent forms are often difficult to distinguish from the closely related *S. holwayi* which has cordate leaves and is glabrous or only sparsely pilose on lower leaf surfaces. Epling maintains *S. siguatepequensis* which differs slightly if at all from typical *S. karwinskii*.

Salvia kellermanii Donn.-Sm. Bot. Gaz. 56: 60. 1913.

Moist or wet, often rocky thickets or in rather dense, mixed forest, 1,200–1,650 m.; Escuintla; Guatemala; Quezaltenango (type from Santa María de Jesús, *Kellerman 5628*). El Salvador; Honduras.

An erect herb or shrub 1–3 m. high, branched, the branches glabrous; leaves rather firm, on long slender petioles, elliptic-oblong or lanceolate, mostly 5–10 cm.



FIG. 59. *Salvia kellermanii*. A, portion of plant, $\times \frac{1}{2}$; B, mature flower from side to show calyx, corolla lobing, anthers in galea and exserted style, $\times 2$.

long, long-acuminate, acute or cuneate-attenuate at the base, serrate, somewhat paler beneath, almost glabrous on both surfaces but villous beneath at the base of the blade and along the lower part of the costa; verticils 3-6-flowered, forming dense many-flowered spikes 3-5 cm. long, the bracts caducous; calyx in anthesis 8 mm. long, glabrous or nearly so, green or bluish, the lobes acuminate, the upper one 3-nerved; corolla bright violet, villous, the tube 8-10 mm. long, not dilated, the upper lip 7-8 mm. long.

An exceptionally handsome plant, although not so showy as some other local species.

Salvia lasiantha Benth. Lab. Gen. & Sp. 276. 1833. *S. chrysanthia* Mart. & Gal. Bull. Acad. Brux. 11: 72. 1844.

Dry brush, rocky mountain hillsides, 1,500-2,200 m.; Zacapa; Sololá; Huehuetenango. Southern Mexico; possibly Costa Rica.

A shrub of 1-2.5 m., often densely branched, the branches woody throughout, densely tomentose with branched hairs; leaves on rather stout petioles, rather thick, oblong-ovate to triangular-ovate, 2-10 cm. long, narrowed to an obtuse apex, truncate to rounded at the base and usually more or less abruptly decurrent, denticulate, green above, usually very rugose, densely pubescent, densely tomentose beneath with branched yellowish hairs; verticils 3-6-flowered, forming short or elongate, usually much interrupted spikes, the bracts rounded, caducous, lanate, the flowers sessile or short-pedicellate, calyx at anthesis 8-16 mm. long, only slightly longer in fruit, densely stellate-tomentose with yellowish or purplish hairs, the lips acuminate to obtuse; corolla dark red or brownish red, rarely pinkish-white, villous, the tube 8-10 mm. long, ventricose; the upper lip erect, 7-16 mm. long; stamens shortly exserted from the galea.

A rather showy shrub, plentiful in some places on the dry rocky south-facing slopes of the Cuchumatanes, where the bushes often are closely cropped by goats.

Salvia lavanduloides HBK. Nov. Gen. & Sp. Pl. 2: 287. 1817.
Salvia de monte (fide Aguilar).

Open, grassy hillsides or most often in open, pine or oak forest, generally in rather dry places, sometimes in open *Abies* forest, frequently growing among tall grasses, 1,500-3,800 m., most common at middle or rather high elevations; Baja Verapaz; Zacapa; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Central and southern Mexico; Honduras.

A slender perennial herb, the stems solitary or several, erect, a meter high or less, simple or very sparsely branched, leafy, puberulent or hirtellous with mostly reflexed hairs; leaves short-petiolate, narrowly elliptic-oblong or lanceolate, mostly 3-9 cm. long, acute or obtuse, acute or attenuate at the base, serrulate, venose, green or greenish on the upper surface, densely pubescent to nearly glabrous, more

densely pubescent beneath and usually grayish or whitish; verticils about 12-flowered, forming very dense spikes 3–12 cm. long and 1.5 cm. in diameter; bracts ovate-attenuate, caducous, the flowers sessile or nearly so; calyx in flower 4–5.5 mm. long, rarely as much as 7 mm. long, whitish and densely strigose to nearly glabrous; corolla intense blue to pale blue or purple, the tube 3.5–4.5 mm. long, the upper lip 2–2.5 mm. long and densely tomentose, the lower one 3–5 mm. long.

A characteristic and often abundant plant of pine-oak forest in many regions, mostly in the drier mountains at the end of the rainy season, November to February.

Salvia leptophylla Benth. Lab. Gen. & Sp. 249. 1833.

Open, grassy rocky slopes, 1,400–1,900 m.; Jalapa; Jutiapa; Huehuetenango. Western Texas; Mexico.

A very slender, erect, perennial herb a meter high or less, the stems simple or branched, glabrous or setulose-pilose, sparsely or rather densely leafy; leaves short-petiolate, linear, 2–8 cm. long, 1.5–5 mm. broad, acute, attenuate at the base, entire or nearly so, glabrous or puberulent or hirtellous; verticils 1–3-flowered, forming very slender, much interrupted spikes 10–30 cm. long, the bracts usually deciduous, the flowers short-pedicellate; calyx glabrous or hispidulous, the lips subequal, 2–3 mm. long, the upper one 7-nerved; corolla blue, the tube 7–10 mm. long, not dilated, the upper lip 3.5–4.5 mm. long.

Salvia leucochlamys Epling, Bull. Torr. Bot. Club 67: 515. 1940.

Dry, open rocky slopes, oak-pine forests, or on shaded cliffs, 1,950–2,800 m.; endemic; Huehuetenango (type from Sierra de los Cuchumatanes above Chiantla, Standley 65650); collected at several stations in the same general region.

A stout perennial herb 30 cm. high or less, arising from a woody rootstock, the stems usually several, erect or ascending, simple or sparsely branched, very densely white-hirsute; leaves small, rather thick, on short stout petioles, broadly ovate or deltoid-ovate, 1.5–3 cm. long, obtuse or rounded at the apex, broadly rounded to subcordate at the base, minutely crenate, usually somewhat rugose, gray above and densely short-hirsute, densely white-tomentose beneath; flowers opposite, arranged in a short interrupted raceme, the bracts caducous; calyx at anthesis 12 mm. long, densely white-hirsute, the lips very short, obtuse or subacute; corolla rose-purple, the tube 12 mm. long, the upper lip 6–7 mm. long, the lower 13 mm. long.

Salvia maxonii Epling, Fedde Rep. Sp. Nov. Beih. 110: 266. 1939.

Known only from the type, near Santa María de Jesús, Quezaltenango, 1,500–1,600 m., Maxon 3569.

Plants herbaceous or suffrutescent, 1.5 m. high, appressed-hirtellous above, soon glabrate; leaves on petioles 3–8 mm. long, elliptic-ovate, 5–12 cm. long,

acuminate, narrowed to the base and somewhat acuminate, serrulate, almost glabrous on both surfaces, short-hirtellous beneath on the veins; verticils 3-6-flowered, forming dense axillary spikes 3-10 cm. long, the bracts caducous; calyx at anthesis 9-10 mm. long, very sparsely hirtellous or almost glabrous, purplish, the upper lip 3-nerved; corolla blue, the tube ventricose, 13 mm. long, the upper lip 10 mm. long, the lower one rounded, slightly shorter; style pilose.

Salvia micrantha Vahl, Enum. Pl. 1: 235. 1805.

Known in our region only from British Honduras, Corozal District, *P. H. Gentle 375A* (fide Epling). Florida; Yucatan Peninsula of Mexico; Honduras; Panama; West Indies.

An erect annual 20-40 cm. high, branched, the slender stems puberulent or hirtellous, often glabrate; leaves slender-petiolate, thin, broadly deltoid-ovate, 1.5-4.5 cm. long, often as broad as long, obtuse or rounded at the apex, generally truncate at the base, crenate, glabrous or nearly so, often hirtellous beneath on the veins; verticils 3-6-flowered, forming long or short, much interrupted racemes, short-pedicellate, the bracts small and inconspicuous, persistent or deciduous; calyx at anthesis 3.5-5.5 mm. long, in age 6-8 mm. long, glandular-pilose, the lips short, acuminate; corolla usually blue, the tube 4-6 mm. long, the upper lip 1-1.5 mm. long, the lower one 2.5-4 mm. long.

Known in Yucatan as "té de Cozumel" and "verbena."

Salvia microphylla HBK. Nov. Gen. & Sp. 2: 294. 1817. *S. grahamii* Benth. Bot. Reg. 16: t. 1370. 1830. *Mirto dulce*; *Salvia silvestre* (fide Aguilar).

Native of Mexico; cultivated occasionally for ornament in Guatemalan gardens (noted in Jalapa, Alta Verapaz, and Guatemala); possibly native in the country since it has been collected as far south as Oaxaca.

A low shrub or a perennial herb, usually a meter high or less, often densely branched, the stems densely puberulent and often viscid; leaves rather thick, slender-petiolate, deltoid-ovate to elliptic or oblong, mostly 1-2.5 cm. long, usually obtuse, generally acute or obtuse at the base, serrate-crenulate or subentire, puberulent or glabrate; flowers mostly opposite, forming interrupted racemes 15 cm. long or usually much shorter, the racemes usually densely viscid-pubescent, the bracts ovate-acuminate, 3-6 mm. long, caducous, the flowers pedicellate; calyx at anthesis 10-15 mm. long, very densely glandular-puberulent, green; corolla rose-red, the tube 16-18 mm. long, the upper lip 6-12 mm. long, the lower one longer, spreading.

Salvia miniata Fernald, Proc. Am. Acad. 35: 545. 1900. *S. lundellii* Epling, Carnegie Inst. Wash. Publ. 522: 236. 1940 (type from British Honduras, Schipp S-632).

Open forests, 800 m.; Petén; Alta Verapaz. Mexico (Chiapas); British Honduras.

An erect shrub or herb 2 m. high or less, the branches glabrous; leaves on petioles 1-2 cm. long, membranaceous, oblong-lanceolate to ovate-elliptic, 10-15 cm. long, 3-5 cm. broad, narrowly long-acuminate, acute or attenuate at the base, serrate, glabrous; verticils 1-3-flowered, forming interrupted or continuous spikes 5-30 cm. long, the bracts reddish, acuminate, caducous, 1 cm. long; calyx at anthesis 11-14 mm. long, glabrous, the upper lip 3-nerved, slightly larger in fruit; corolla scarlet, the tube 20-27 mm. long, the upper lip 8-15 mm. long, the lower one of about the same length; stamens short-exserted from the galea; style glabrous.

Salvia misella HBK. Nov. Gen. & Sp. Pl. 2: 290. 1817. *S. riparia* HBK. l.c. 300, *syn. nov.*; *S. privoides* Benth. Bot. Voy. Sulph. 150. 1844 (type, Honduras, *Sinclair*).

Weedy thickets and disturbed and cultivated areas, 200-2,000 m.; Petén; Santa Rosa; Zacapa; Chiquimula; Jutiapa; Chimaltenango; Guatemala; San Marcos; doubtless to be found in most departments. Mexico; Central America; West Indies south to Peru.

Plants annual or perhaps also perennial, decumbent or procumbent, the stems often rooting below, 60 cm. long or less, branched, puberulent, hispidulous to pilose, or glabrate, glandular-pilose in the inflorescence; leaves membranaceous, petiolate, broadly ovate or rhombic-ovate, 1.5-3.5 cm. long, acute or obtuse, broad at the base and abruptly contracted and decurrent upon the petiole, crenate, sparsely villous or hirsute on both surfaces; verticils 1-12-flowered, forming long, slender, much interrupted spikes 10-30 cm. long, sessile or short-pedicellate, the bracts lanceolate-ovate to broadly ovate, green, abruptly acuminate, 2-5 mm. long, persistent; calyx at anthesis 2-3.5 mm. long, in age to 8 mm., glandular-hispidulous, the upper lip rounded-acuminate with a spinulose apex, the lower segments of the calyx ovate, spinulose-tipped; corolla blue, the tube cylindric, 2.5-3 mm. long, the upper lip 1.5 mm. long, erect, the lower lip 2.5 mm. long.

Salvia mocinnoi Benth. Lab. Gen. & Sp. 271. 1833; L. Wms. Fieldiana, Bot. 34:112. 1972. *S. lophantha* Benth. in DC. Prodr. 12: 301. 1848 (type from Barranco de Inciensio, *Skinner*). *Clarin; chichigaste azul; flor de San Celestino*.

Moist or dry thickets, rocky slopes, often in oak or pine forests, 300-2,000 m.; Chiquimula; Jutiapa; Jalapa; Zacapa; Santa Rosa; Guatemala; Chimaltenango; Escuintla; Sacatepéquez; San Marcos (?). Mexico; El Salvador; Honduras; Nicaragua.

Erect perennial herbs or subshrubs to about 1.5 m. tall, sparsely to profusely branched, the stems quadrate, puberulent to glabrate, sometimes densely pubescent; leaves ovate-lanceolate to ovate, acute or acuminate, the base usually attenuate, rarely obtuse, crenate-serrate, pubescent on both faces to almost completely glabrous, 4-10 cm. long and half as broad; petioles mostly 1-5 cm. long; inflorescence a spike of compact to open 4-8-flowered verticils, to 14 cm. long but

usually much less, the verticils each subtended by opposite large and conspicuous bracts as broad as long, cordate, acuminate, pubescent and glandular or not, usually bluish or blue, sometimes reddish, persistent; calyx campanulate or narrower, pubescent or glandular-pubescent to almost glabrous, 5.5–7.5 mm. long, the lobes mostly 1–2 mm. long; corolla bilabiate, the tube 6–8 mm. long, the upper lobe 2.5–3.5 mm. long, the lower trilobulate, to about 7 mm. long.

Not uncommon at middle and lower elevations in the central mountains. A variable species difficult to define.

Salvia nana HBK. Nov. Gen. & Sp. Pl. 2: 289. 1817. *S. nana* var. *eglandulosa* Epling, Fedde Rep. Sp. Nov. Beih. 110: 66. 1938 (type from Quezaltenango, Hartweg 609).

Moist or dry pine-oak forest or subalpine meadows, 1,800–3,500 m.; Huehuetenango; Quezaltenango. Central and southern Mexico.

A perennial herb arising from a cluster of tuberous-thickened roots, the stems erect, slender, 35 cm. high or less, usually simple, glandular-pilose or almost glabrous, naked; leaves few or numerous, basal, sessile or short-petiolate, rather thick and firm, ovate to rhombic-elliptic or obovate, 4–9 cm. long, rounded or obtuse at the apex, cuneate at the base, crenate, glabrous above, deep purple beneath, villosulous on the veins; verticils 3–6-flowered, usually few, forming short, much interrupted, simple spikes, the bracts 5–8 mm. long, deciduous; calyx at anthesis 5–6 mm. long, glandular-hispidulous or hirtellous with eglandular hairs, in age 8 mm. long and with prominent black glands, the upper lip tridentate, often truncate; corolla violet, the tube 5–6 mm. long, the upper lip 3.5 mm. long, the lower one 6.5–9 mm. long.

The Guatemalan material belongs to the endemic variety *eglandulosa*, in which the inflorescence is nearly or quite without glandular-pubescent. In spite of the large gap in range from Mexico to Guatemala the differences are not impressive.

Salvia occidentalis Swartz, Prodr. Veg. Ind. Occ. 14. 1788. *Pegapega; mozotillo.*

Wet to dry thickets or fields, often in waste ground, especially about dwellings, or a weed in cultivated ground, 2,500 m. or less, mostly at low elevations; Alta Verapaz; Zacapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitepéquez; Retalhuleu; Quezaltenango. Mexico; British Honduras to El Salvador and Panama; West Indies; South America.

An annual or perennial herb, the stems mostly 50 cm. long or less, prostrate to ascending, usually much branched, puberulent, hirtellous, or glabrate, usually rather densely glandular-pilose in the inflorescence; leaves mostly on rather short petioles, membranaceous, ovate to broadly rhombic-ovate, mostly 2–6 cm. long, obtuse or acute, rounded or generally cuneate at the base, crenate-serrate, sparsely or usually densely villous-pilose on both surfaces; verticils mostly 6-flowered,

forming slender, much interrupted spikes 10–30 cm. long, the bracts broadly ovate, abruptly acuminate, 2–2.5 mm. long, persistent but inconspicuous, the flowers short-pedicellate; calyx at anthesis 2 mm. long, ovoid-cylindric, glandular-pubescent, the upper lip subtruncate, obscurely 3-mucronate, the teeth of the lower lip ovate, acuminate, not spinulose-tipped, the calyx in age scarcely 3 mm. long, green; corolla blue, the tube cylindric, 2.5 mm. long, the upper lip 1.5 mm. long, concave, erect, the lower lip 2.5 mm. long.

Known in El Salvador by the names "hierba de cangro," "trenilla negra," "mozote de pollo," "gonce de gallina," and "mozote de gallina." Some of these names allude to the fact that the very viscid calyces often adhere in great numbers to the feathers and feet of small chickens or even of larger birds. It is known as "mozotillo" in Honduras.

Salvia opertiflora Epling, Bull. Torr. Bot. Club 68: 568. 1941.

Known only from the type, Chiquimula, Volcán de Quezaltepeque, in open thicket, 1,500–2,000 m., Steyermark 31469.

An erect shrub, the branches densely pilose-hirsute with spreading brownish hairs; leaves membranaceous, at least the upper ones on petioles 1 cm. long or shorter, lanceolate or ovate-lanceolate, 7–9 cm. long, gradually long-acuminate, cuneate and decurrent at the base, crenate-serrate, thinly scabrous above, somewhat paler beneath, softly pilose especially on the veins, the veins elevated and reticulate; flowers few, axillary (in the only specimens but probably more numerous and spicate in well developed plants), the pedicels 4–5 mm. long; calyx glabrous, pale green, at anthesis 12 mm. long, the lips subequal, acuminate, 4 mm. long, the upper one 3-nerved; corolla purple, the tube 18–21 mm. long, somewhat ampliate above, villous outside, the upper lip 11–13 mm. long, the lower one of about the same length.

Salvia pansamalensis Donn.-Sm. Bot. Gaz. 23: 249. 1897.

Moist or wet forest, 1,100–2,100 m.; endemic; Alta Verapaz (type from Pansamalá, Tuerckheim 933); Huehuetenango.

A branched erect perennial herb a meter high or less, almost glabrous throughout, the branches sparsely puberulent or hispidulous when young; leaves firm-membranaceous, on petioles about 5 mm. long, elliptic or ovate-elliptic, 10–20 cm. long or often shorter; caudate-acuminate, cuneate at the base, serrate with small, often salient teeth; verticels 1–3-flowered, forming rather few-flowered, much interrupted racemes 5–10 cm. long, pedicellate, the bracts caducous; calyx at anthesis 10 mm. long, hispidulous on the nerves only, dark purple, the lips abruptly short-acuminate, subequal; corolla deep purple, villous above, the tube 15–17 mm. long, ventricose, the upper lip 6 mm. long, the lower one 8 mm. long; style pilose.

Salvia phaenostemma Donn.-Sm. Bot. Gaz. 23: 13. 1897.

At 450–1,200 m.; endemic; Quiché; Quezaltenango; San Marcos (type collected between Rodeo and Malacate, E. W. Nelson 3736).

A branched shrub 3.5 m. high or less, the branches sparsely short-hirtellous, soon glabrate; leaves on slender petioles 1–3 cm. long, thin, ovate, 6–10 cm. long, short-acuminate, rounded at the base, serrate, almost glabrous on both surfaces; verticils [mostly 3-flowered, on pedicels 8–10 mm. long, forming numerous lax paniculate interrupted racemes 20–40 cm. long, the bracts caducous; calyx at anthesis 11–12 mm. long, glabrous, slightly larger in age, the lips acuminate; corolla blue, the tube cylindric, 17–18 mm. long, the upper lip 6–7 mm. long, the lower one slightly shorter.

Salvia polystachya Ortega, Hort. Matr. Dec. 55. 1797; L. Wms. Fieldiana, Bot. 34: 112. 1972. *S. compacta* Kuntze, Rev. Gen. 530. 1891. *S. polystachya* var. *albicans* Fernald, Proc. Am. Acad. 35: 512. 1900 (type from Santa Rosa, Heyde & Lux 4394). *S. polystachya* subsp. *durandiana* Briq. Bull. Soc. Bot. Belg. 30: 237. 1891. *S. cataria* Briq. Ann. Cons. Jard. Bot. Genéve 2: 142. 1898. *S. reducta* Epling, Fedde Rep. Sp. Nov. Beih. 110: 169. 1939 (type from Quetzaltenango, Shannon 260). *Armadilla*; *ardilla silvestre*; *gusanillo azul*; *chichinguate*; *flor de burrón*.

Open or brushy, moist or rather dry, often rocky fields and hill-sides, frequent in oak-pine areas and occasionally in *Alnus* forests, 1,100–2,850 m., known in all departments except Petén and Izabal. Not known from British Honduras. Mexico through Central America to Panama.

Perennial herbs or subshrubs 0.5–1.5 m. tall, sparsely to copiously branched, the stems pilose to puberulent with simple eglandular hairs; leaves with petioles somewhat shorter than the blades, the blades oblong-lanceolate to ovate-suborbicular, acuminate, cuneate to subcordate at the base, crenate-serrate, sparsely pubescent to glabrous above, sparsely to densely soft pubescent below, 3–15 cm. long and 1.5–9 cm. broad; inflorescences terminal compact villous spikes to about 15 cm. long, sometimes interrupted at the base, the bracts caducous; flowers blue or white; calyx 2.5–5 mm. long, villous; corolla mostly 8–10 mm. long, the tube 4–8 mm. long, the lips about equal, 3–4.5 mm. long, the dorsal lip pilosulose; style obscurely pilosulose dorsally.

Called "cola de pezote" in El Salvador. A rather handsome plant which is abundant in many places in the Guatemalan mountains, often forming dense stands of considerable extent. Epling and others have treated *Salvia compacta* and *S. reducta* as distinct species but none of the characters that are supposed to separate them seem to have any stability, if indeed they exist at all. The three species are sympatric and it seems more in agreement with the probable facts in the matter to treat them as a single species. Numerous varieties have been described but none of these seem to us worthy of special designation.

Salvia purpurea Cav. Icon. 2: 52, t. 166. 1793. *S. oxyphylla* Brandegee, Univ. Calif. Publ. Bot. 6: 61. 1914 (type from Cerro del Boquerón, Chiapas.) *Chan*; *chichinguaste*; *Clarín de monte* (fide Aguilar); *ponpón lila*; *cuatro-filos morada* (fide Morales); *tutzunún* (Cobán, Quechí); *chichinguaste morado*; *chaptzuún* (Huehuetenango).

Moist or wet thickets or fields or in dense or usually open forest, especially of pine or oak, sometimes in *Liquidambar* forest, 350–2,500 m., most common at middle elevations; Alta Verapaz; Baja Verapaz; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico; Honduras.

An erect perennial herb, usually 1–2 m. high, often much branched, the stems puberulent above or almost glabrous; leaves thin, on long slender petioles, lance-ovate to broadly ovate, mostly 6–12 cm. long, acuminate, rather narrowly rounded at the base or rarely subcordate, serrulate, sparsely and finely puberulent or glabrous on the upper surface, somewhat paler beneath, puberulent on the veins; verticils with 3 or more flowers, usually densely crowded and forming dense and continuous or somewhat interrupted, paniculate spikes, the bracts small, caducous; calyx at anthesis 4–9 mm. long, densely and finely whitish-hirtellous or sometimes lanate, frequently purplish, the teeth acuminate; corolla bright purple, the tube cylindric, 10–18 mm. long; style usually pilose.

Called "flor morada" in Honduras. A large and very showy plant, abundant in many localities. In general appearance, at least in herbarium specimens, it resembles *S. polystachya* but that has much shorter and less showy, blue rather than purple corollas. In the field the two species are easily distinguished.

Salvia recurva Benth. in DC. Prodr. 12: 336. 1848.

Moist or wet, mixed, mountain forest, 2,600–3,000 m.; Huehuetenango (Sierra de los Cuchumatanes). Southern Mexico.

A rather stout, branched, erect, perennial herb 1–2 m. high, the stems glabrous or minutely glandular below, viscid-villous above, at least in the inflorescence; leaves thin, on long slender petioles, ovate or deltoid-ovate, mostly 7–15 cm. long, long-acuminate, rounded or shallowly cordate at the base, serrate, glabrous beneath or nearly so, very densely punctate with minute yellowish glands; verticils 6–12-flowered, forming elongate, lax and interrupted racemes 30 cm. long or less, the bracts rounded, caducous, the flowers on rather long pedicels; calyx at anthesis 9–11 mm. long, much accrescent in age, violet, sparsely villous, the upper lip erect-recurved, 3–5-nerved, rounded and long-cuspidate at the apex; corolla bright violet, the tube 20–25 mm. long, strongly ventricose, the upper lip 13–20 mm. long, the lower one of about the same length.

Salvia rubiginosa Benth. in DC. Prodr. 12: 301. 1848.

Open deciduous forest, 1,800 m.; Quiché (Nebaj, A. F. Skutch 1728). Southern Mexico.

A shrub 2.5 m. high or less, the branches villosulous with short, yellowish, sometimes sparsely branched hairs; leaves thin, on petioles 1 cm. long or shorter, ovate to lance-oblong, 4–11 cm. long, obtuse to acuminate, rounded to attenuate at the base, finely crenate-serrate, green above, sparsely villosulous, often bullate, somewhat paler beneath, usually subtomentose; verticils 6–8-flowered, forming lax or rather dense spikes 5–15 cm. long; calyx at anthesis 6–7 mm. long, bluish, hispidulous or short-hirsute and usually viscid; corolla light blue, the tube cylindric, 5–6.5 mm. long, the upper lip 2–3.5 mm. long, the lower one 5–6 mm. long.

Known in Guatemala from two collections from Nebaj and those not typical.

Salvia shannonii Donn.-Sm. Bot. Gaz. 19: 256. 1894. *Clarín de monte* (fide Aguilar).

Usually in pine-oak forest, 900–1,700 m.; Chiquimula; Jutiapa (type from Volcán de Chingo, *Shannon 3612*); Santa Rosa; Guatemala. Mexico (Chiapas); El Salvador; Honduras.

A shrub 1.5 m. high or less, the branches densely whitish-hispidulous; leaves on petioles 1–1.5 cm. long, rather thick, ovate-lanceolate or narrowly ovate, mostly 7–12 cm. long, acute or acuminate, rounded to cuneate at the base, serrulate, softly pubescent above, pale beneath, usually densely white-tomentose; verticils 6–12-flowered, forming dense continuous spikes 8 cm. long or shorter, the bracts large and conspicuous, persistent, densely pubescent, ovate or lanceolate; calyx in anthesis 9–10 mm. long, hispidulous or rarely glandular-pilose; corolla lilac or purplish white, the tube 7.5–9 mm. long, cylindric, the upper lip 5–6 mm. long, densely villous outside; style villous above.

Called "monte amargo" in El Salvador, and used in domestic medicine for treating malaria.

Salvia sparsiflora Epling, Bull. Torr. Bot. Club 71: 494. 1944. *Shapsinún*. Known only from the type, Huehuetenango, Sierra de los Cuchumatanes, between Las Palmas and Chaculá, 1,400–1,600 m., Steyermark 51740.

Plant suffrutescent, about a meter high, the branchlets hirtellous with short, recurved or retrorse hairs; leaves on petioles 5–6 mm. long, subcoriaceous, ovate-elliptic, 3–4 cm. long, obtuse or short-acuminate, rounded and narrowed at the base, serrulate, hirtellous on both surfaces, especially on the veins; flowers 1–3 in each verticil, the clusters 3–6 mm. apart, forming interrupted spikes 3–5 cm. long; bracts caducous; calyx at anthesis 7–8 mm. long, sparsely hispidulous, slightly larger in age; pedicels 5 mm. long; corolla purple, the tube 12 mm. long, more or less ventricose above.

Salvia splendens Sellow ex Roem. & Schult. Syst. Veg. Mant. 1: 185. 1822. *Julia; Julita.*

Native in Brazil; cultivated commonly for ornament in most temperate and tropical regions; a very common ornamental plant of Guatemalan gardens.

An erect annual, usually branched and less than a meter high, the branches minutely puberulent above, glabrous below or nearly so; leaves thin, on long slender petioles, ovate, acuminate, rounded at the base, serrate, glabrous or nearly so; verticils 1-3-flowered, forming short or elongate, rather dense or much interrupted spikes, the bracts large, scarlet, caducous; calyx at anthesis inflated and membranaceous, scarlet, 15-20 mm. long; corolla scarlet, the tube 30-40 mm. long, ampliate above, the upper lip 7 mm. long; style glabrous.

Called "chulita" in El Salvador. The usual names in the United States are "salvia" or "scarlet sage." The plant is very common in gardens and parks of Guatemala, at almost all elevations.

Salvia subrubens Epling, Fedde Rep. Sp. Nov. Beih. 110: 335. 1939.

Quiché (type, *Heyde & Lux 3120*); San Marcos. Endemic.

A suffrutescent herb a meter or more tall, the stems hispidulous, especially in the inflorescence; leaves on petioles 2-6 cm. long, broadly ovate, 6-12 cm. long, short-acuminate, rounded at the apex and abruptly decurrent, serrulate, glabrous; verticils mostly 3-flowered, forming lax interrupted spikes 20-40 cm. long, these paniculate, the pedicels 6-7 mm. long, the bracts caducous; calyx at anthesis 12-14 mm. long, reddish, minutely hispidulous, especially on the nerves, the lips subequal, lobes of the anterior lip completely or almost connate, acuminate; corolla red (?), the tube ampliate above, 24 mm. long, the upper lip 9-10 mm. long, the lower one rounded, of about equal length; stamens short-exserted from the galea; style pubescent above.

This species has been reported from Guatemala as *S. phaenos-temma* Donn.-Sm. and as *S. excelsa* Benth.

Salvia tiliaefolia var. *tiliaeefolia*. *S. tiliaefolia* Vahl, Symb. Bot. 3: 7. 1794; Epling, Fedde Rep. Sp. Nov. Beih. 110: 241. 1939; L. Wms. Fieldiana, Bot. 34: 113. 1972. *Chan de monte; enaldo de montaña; piojillo; lengua de perro* (Huehuetenango); *chan; Julia de monte.*

Wet or dry thickets and fields, often in oak-pine forests, occasionally a weed in cultivated lands, especially coffee plantations, along streams, 1,200-2,800 m. or perhaps occasionally lower; Alta Verapaz; Baja Verapaz; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Totonicapán; Huehuetenango; Quezaltenango. Mexico; Honduras; El Salvador; Nicaragua; Costa Rica; Panama; Venezuela; Ecuador.

An erect annual or perennial herb, usually 75 cm. high or lower, simple or generally branched, often much branched, the stems puberulent or appressed-hirtellous above, glabrous below; leaves thin, slender-petiolate, deltoid-ovate or rhombic-ovate, mostly 4–6 cm. long, short-acuminate to very obtuse, rounded-truncate and usually abruptly decurrent at the base, crenate-serrate, very sparsely pubescent on both surfaces or more often almost glabrous; verticils 3–6-flowered, arranged in slender, rather dense racemes 15–30 cm. long, the bracts small, lance-acuminate, deciduous; calyx at anthesis pale green, 7 mm. long, hispidulous on the nerves, elsewhere glabrous, the lower lip in age 3.5–4 mm. long; corolla blue or pale blue, the tube cylindric, about 4 mm. long, the upper lip 1–2 mm. long, the lower one 2–2.5 mm. long.

A very common weedy plant in the central mountains of Guatemala. The seeds are produced in great abundance and they often are gathered to be used like those of *S. hispanica* in preparation of cool beverages. The plant has been reported as in use in northern Guatemala and Honduras for destruction of head lice.

Salvia tiliaefolia var. **albiflora** (Mart. & Gal.) L. Wms. Fieldiana, Bot. 34: 113. 1972. *Salvia albiflora* Mart. & Gal. Bull. Acad. Brux. 11, pt. 2: 76. 1844; Epling, Fedde Rep. Sp. Nov. Beih. 110: 254. 1939.

In wet thickets and forests, often in clearings, 2,600 m. or usually much less; Petén; Izabal; Guatemala; Chiquimula; San Marcos. Mexico; Honduras; Panama.

Erect branched herbs to 1.5 m. tall, annual or perhaps more enduring, the stems slender, puberulent between the angles or becoming glabrous; calyx at anthesis 4–5.5 mm. long, glabrous or nearly so, sometimes puberulent on the angles.

This variety is distinguished from the typical variety by the glabrous or nearly glabrous calyces which are rarely more than 5 mm. long.

Salvia tiliaefolia var. **alvajaca** (Oersted) L. Wms. Fieldiana, Bot. 34: 113. 1972. *S. alvajaca* Oersted, Dansk. Vid. Medd. 1853: 38. 1853.

Moist or wet thickets and forests, 1,300–2,400 m.; San Marcos; Quezaltenango; Totonicapán.

Branched herbs 1.5 m. tall or less, the stems puberulent; calyx at anthesis 7–8 mm. long, glabrous or minutely puberulent.

This variety differs from the preceding one in having the calyces 7–8 mm. long at anthesis; they are glabrous or nearly so. This form with large calyx is most common in Costa Rica but the specimens from Guatemala seem to differ in no substantial way.

Salvia urica Epling, Fedde Rep. Sp. Nov. Beih. 110: 175. 1939.
Chichingua azul (fide Aguilar); *pendolita morada*; *canastillas*; *cohetillo*; *tutzunún* (Cobán, Quecchí).

Wet to rather dry thickets, open fields or slopes, sometimes in rocky places, often in rather dense, mixed forest or in open pine-oak forest, 300–2,700 m.; Petén; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango (type collected in the region of Quezaltenango, *Skutch* 82). Mexico; British Honduras; Honduras.

A rather coarse, erect, perennial herb usually a meter high or less, generally branched, the stems densely villous-hirsute with long spreading white hairs, often somewhat viscid; leaves thin, on long slender petioles, broadly ovate to deltoid-ovate or oblong-ovate, mostly 5–15 cm. long, acuminate, generally cordate at the base, crenate-serrate, green and rather densely pilose on the upper surface, usually rather densely but laxly whitish-tomentose beneath; verticils 3–6-flowered, forming short or elongate, interrupted, lax racemes, these rarely paniculate, the bracts caducous, the rachis viscid-pilose with long spreading hairs; calyx at anthesis 7–12 mm. long, viscid-hirsute, the lips subequal, the upper one obtuse and apiculate, 5-nerved; corolla bright violet or blue, the tube 8–15 mm. long, the upper lip 4.5–9 mm. long, the lower one rounded, 8–12 mm. long.

A specimen from British Honduras and another from Petén, if of this species, are large flowered and with other characters that may indicate that they do not belong here. No others are from the lowlands.

Salvia wagneriana Polak. Linnaea 41: 591. 1877. *S. tonduzii* Briq. Ann. Cons. Jard. Bot. Genève 2: 157. 1898. *Corazón de Jesús*.

Moist or wet thickets or dense mixed forest, 1,500–2,500 m.; Alta Verapaz; Chiquimula; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá. El Salvador; Nicaragua; Costa Rica; Panama.

A slender shrub 1–4.5 m. high, often forming dense clumps, sometimes herbaceous throughout, the stems glabrous below, densely brownish-tomentulose or glandular-villosulous above; leaves thin, slender-petiolate, ovate, acute or acuminate, rounded or usually cuneate at the base, serrate, glabrous or often short-villosulous above and somewhat tomentose with branched hairs beneath; verticils several-many-flowered, forming very dense or interrupted, short or elongate spikes, the rachis densely viscid-tomentose, the flowers slender-pedicellate, the bracts broad, rounded, bright red, usually ciliate and red-villous; calyx at anthesis 14–15 mm. long, red, densely glandular and villous; corolla bright red to rose, the tube 22–34 mm. long, ventricose; style pilose above.

This has been reported from Guatemala as *S. involucrata* Cav., a Mexican species. The plant is occasionally cultivated for ornament

in the central region. It is the most showy and probably the handsomest of all the species in the country. It is likely that the species has escaped from cultivation in Guatemala and elsewhere.

UNRECOGNIZED OR EXCLUDED SPECIES

SALVIA CRINIGERA Gandofer, Bull. Soc. Bot. France 65: 68. 1918.

No specimens have been available for study.

SATUREJA L.

Reference: Rogers McVaugh & Rudolf Schmid. Novelties in *Satureia* sect. *Gardoquia*, *Brittonia* 19: 261-267. 1967.

Shrubs or perennial herbs, various in habit; leaves mostly small, dentate or entire; flowers small or large, solitary in the leaf axils or in dense or open cymules; calyx tube usually cylindric, sometimes campanulate, 13-15-nerved, the limb commonly more or less bilabiate, the 3 upper teeth somewhat connate, the 2 lower ones distinct, the throat of the tube glabrous or pilose; corolla tube gradually dilated upward, often somewhat arcuate; upper corolla lip erect, emarginate, the lower of about the same length, spreading; stamens 4, inserted above the middle of the corolla tube, didymous, the posterior ones slightly shorter, the filaments glabrous, the anther cells divaricate; style exserted, unequally bifid at the apex; nutlets oblong or ovate, sometimes mucronate.

The genus *Satureja*, *sens. lat.*, contains some 150 or more species widely distributed in both hemispheres. The generic description given above reflects the two diverse species found in Guatemala. We believe that neither of these species belong in the genus *Satureja*, which is typified by the Old World and weedy *Satureja hortensis* L., nor do they seem to belong in the same genus.—The following are the only species of this complex known in Central America.

Corolla bright red, about 30 mm. long; a large shrub. *S. seleriana*.
Corolla purple or lilac and white, about 8 mm. long; a small herb. *S. brownei*.

***Satureja brownei* (Swartz) Briq.** in Engler & Prantl, *Pflanzenfam.* IV. 3a: 300. 1897. *Thymus brownei* Swartz, *Prodr. Veg. Ind. Occ.* 89. 1788. *Micromeria brownei* Benth. *Labiat.* 372. 1834. *Poleo*.

Moist or wet thickets or meadows, often in marshes or along the edges of small mountain streams, or on wet banks, 1,200-2,500 m.; Alta Verapaz; Baja Verapaz; Jalapa; Sacatepéquez; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern United States; Mexico; Honduras; Costa Rica; West Indies; northwestern South America.

Plants perennial from long slender creeping root stocks, the stems mostly 20 cm. long or less, leafy, glabrous or nearly so; leaves on short slender petioles, broadly ovate to suborbicular, mostly 5–12 mm. long, rounded or very obtuse at the apex, rounded or truncate at the base, entire or obscurely crenate, glabrous or sometimes sparsely pilose beneath; flowers purple, or lilac and white, solitary in the leaf axils, slender-pedicellate; calyx glabrous, 3.5–4 mm. long, the teeth small, the lower ones deltoid-ovate, the upper ones half as long; corolla tube about 3.5 mm. long.

A common plant of marshes in the Guatemalan mountains, mostly at middle elevations. It has been reported from Guatemala as *Micromeria xalapensis* HBK. (*Satureja xalapensis* Briq.), a species described from Mexico but probably in no way distinguishable from *S. brownei*. Dr. Shinners (Sida 1: 95. 1962) indicates that the Guatemalan plant should be called *Micromeria brownei* var. *pilosiuscula* Gray and that *Satureja xalapensis* is a synonym. The plant has a strong odor of pennyroyal (*Hedeoma pulegioides*). The oil of the latter is often employed in the United States, applied to the skin, as a preventive of mosquito bites. It is to be presumed that the *Satureja* has the same properties.

Satureja seleriana Loesener, Verh. Bot. Ver. Brandenb. 51: 35. 1909. *S. seleriana* var. *guatemalensis* Loesener, l.c. 36 (type collected above Todos Santos, Huehuetenango, *Seler 2941*). *S. guatemalensis* Standl. ex Epling & Jativa, Brittonia 20: 309. 1968 (type from Chimaltenango, *Standley 61119*). *Chacul, betchi* (Huehuetenango); *coral de gorrión* (fide Aguilar).

Moist or wet, usually dense, mixed forest, or often in *Cupressus* forest, 2,300–3,000 m.; Chimaltenango (type from Santa Elena, Cerro de Tecpán, *Seler 2352*); Quezaltenango; Quiché; Totonicapán; Huehuetenango. Mexico (Chiapas).

A slender, often rather weak shrub 2 m. high or less, rather sparsely branched, the older branches brown, the young ones puberulent with recurved hairs; leaves on short slender petioles, membranaceous, ovate or oblong-ovate, 1.5–3.5 cm. long, acute, obtuse or acute at the base, remotely serrulate, glabrous or nearly so, somewhat paler beneath; flowers solitary in the leaf axils, bright deep red, the pedicels 4–9 mm. long, glabrous; calyx 7 mm. long, glabrous or nearly so, conspicuously costate, the teeth narrowly triangular, acute, often densely ciliate, the 3 upper ones slightly shorter than the others, the throat densely barbate; corolla about 3 cm. long, slender, 6 mm. broad in the throat, densely pubescent or short-pilose throughout, more densely so near the base.

SCUTELLARIA L. Skullicap

References: E. C. Leonard, The North American species of *Scutellaria*, Contr. U. S. Nat. Herb. 22: 703–748. 1927. Carl Ep-



FIG. 60. *Satureja seleriana*. A, branch of the plant, $\times 1$; B, flower, $\times 2$.

ling, Apuntos sobre el género *Scutellaria* en la América tropical y subtropical, Lilloa 4: 229-275. 1939. Carl Epling, The American species of *Scutellaria*, Univ. Cal. Publ. Bot. 20: 1-146. 1942.

Herbs of suffruticose herbs. Leaves entire or usually dentate, floral leaves similar to the cauline ones or reduced to bracts, the bracts often soon deciduous; inflorescence spicate, racemose or rarely paniculate, or flowers subverticellate in axils of leaves; flowers usually opposite in the verticils but occasionally alternate, blue violet, red, yellow or white; calyx campanulate, bilabiate, the dorsal lobe bearing a rounded dorsal appendage, the lips entire, closed after anthesis, in age separating to the base, the anterior lip persisting; corolla tube long and narrow, straight or arcuate, somewhat expanded above, limb bilabiate, the posterior lip erect, galeate, entire or emarginate, the anterior lip spreading or deflexed, broad, concave, emarginate; stamens 4, didynamous, the anterior pair longer, ascending beneath the galea, filaments naked, anthers of lower pair each usually with one cell abortive; style subulate, the upper branch reduced or wanting; nutlets ovoid or obpyriform, borne on a gynophore, tuberculate or hispid, rarely smooth.

The *Scutellarias* of America have been the subject of three formal studies—a study of all the American species by Dr. Epling; a study of the North American species by Dr. Leonard; and a study of the tropical and subtropical species by Dr. Epling. This is a most unusual situation since most of the genera of plants of our region have never been the subject of a formal revision.

Scutellaria is widely distributed in temperate and tropical regions of both hemispheres. It is most common in mountainous regions in the tropics. Dr. Epling records 113 species of the genus in the Americas. We have not accepted several of the species which he kept and believe that our treatment contains more names than the actual number of species to be found in Guatemala. Other species are reported from southern Central America and Panama while a large number are native of Mexico.

Leaves conspicuously hastate-lobate at the base, otherwise entire; flowers blue or purple. *S. racemosa*.

Leaves not at all hastate, often or usually dentate.

Plants with segmented hirsute pubescence; lowermost leaves nearly round. *S. lundellii*.

Plants not as above.

Corolla blue, purple, lilac, or violet.

Stems pubescent only on the angles. *S. dumetorum*.

Stems pubescent on all sides.

Petioles of the middle cauline leaves mostly 1-2 cm. long; leaf blades often somewhat cordate at the base. *S. purpurascens*.

Petioles of the middle cauline leaves mostly 4-8 mm. long, rarely longer; leaf blades not at all cordate at the base.

Stems usually simple, the racemes terminal; corolla 13-14 mm. long. *S. guatemalensis*.

Stems branched; the racemes terminal and axillary; corolla 10-15 mm. long. *S. seleriana*.

Corolla yellow, red, or white.

Corolla yellow or white.

Corolla white; stems velutinous-pilose..... *S. orichalcea*.

Corolla yellow; stems puberulent, the hairs short, curved upward. *S. lutea*.

Corolla red.

Rachis of the inflorescences densely pilose with spreading, usual short hairs.

Corolla tube strongly curved, the lower lip 3.5 mm. long... *S. inflata*.

Corolla tube almost straight, the lower lip 6-7 mm. long... *S. lundellii*.

Rachis of the inflorescence puberulent with very minute hairs having scarcely any appreciable length..... *S. longifolia*.

Scutellaria dumetorum Schlecht. Linnaea 7: 400. (before Feb.) 1832. *Scutellaria caerúlea* Moc. & Sessé ex Benth. in Lindl. Bot. Reg. 18: sub t. 1493. (May 1) 1832. *S. chalicophila* Loes. Bull. Herb. Boiss. 7: 569. 1899 (type collected between Chaculá and Uaxacanal, Huehuetenango, *Seler 2824*). *Pelo de león*.

In pine forest, 1,400-2,800 m.; Sacatepéquez; Huehuetenango. Central and southern Mexico.

Plants perennial from a cluster of rather thick, hard roots, the stems sparsely branched, 15-50 cm. high, sparsely pubescent on the angles with curved hairs; leaves on petioles 3-5 mm. long, ovate or rhombic-ovate, 2-5 cm. long, obtuse or subobtuse, cuneate to rounded at the base, crenate, almost glabrous but with a few hairs above and on the nerves beneath, paler beneath; flowers few, forming terminal leafy racemes, often longer than the upper leaves; calyx 3 mm. long, bearing a few curved hairs; corolla violet, 15-22 mm. long, the tube 5 mm. broad above, finely pubescent; nutlets 1.5 mm. long.

Scutellaria guatemalensis Leonard, Contr. U. S. Nat. Herb. 22: 715. 1927. *S. purpurascens* var. *heterophylla* Benth. in DC. Prodr. 12: 416. 1848 (type said to be from Guatemala, *Friedrichthal*).

Moist or dry thickets or forest, about 1,800 m.; Baja Verapaz (type from Santa Rosa, *Heyde & Lux 3123*); Quiché (San Miguel Uspantán). Mexico (Chiapas).

Plants erect or ascending, the stems simple or sparsely branched, 10-30 cm. high, densely and finely grayish-pubescent; leaves on petioles 5-12 mm. long, ovate or broadly ovate, 1-4 cm. long, subobtuse, truncate or shallowly cordate at the base, coarsely crenate-dentate, grayish-pubescent on both surfaces; floral bracts except the leaf-like lowest ones lanceolate; racemes simple, 3-5 cm. long, the pedicels 2-4 mm. long, pubescent; calyx 1.5-2 mm. long at anthesis, 4 mm. long in fruit, pubescent; corolla purple, 12-15 mm. long, finely pubescent, the tube 2 mm. broad in the throat.

It seems entirely unlikely that *S. guatemalensis* is distinct from *S. seleriana*.

Scutellaria inflata Epling, Lilloa 4: 270. 1939.

Dense wet mixed forest, 900–1,600 m.; Petén (Camp 36, British Honduras border); Alta Verapaz (type from Cobán, *Tuerckheim II. 2029*; collected also in the region of Tactic); San Marcos. British Honduras.

A slender erect perennial herb about a meter high, the stems sparsely branched, somewhat suffrutescent below, densely pilose with short spreading hairs; leaves on petioles 1–2.5 cm. long, ovate-oblong or elliptic-oblong, mostly 7–12 cm. long and 3–5 cm. broad, acuminate, rounded to broadly cuneate at the base, sinuate-dentate or subentire, thinly villous above or glabrate, rather densely and softly pilose beneath with long pale spreading hairs; racemes 5–15 cm. long, lax, almost naked; calyx in anthesis 4.5 mm. long, densely pilose; corolla bright red, 4 cm. long, the tube arcuate, 4–5 mm. broad above, densely pubescent.

This has been reported from British Honduras as *S. longifolia* Benth., of which it may be a synonym.

Scutellaria longifolia Benth. in Lindl. Bot. Reg. 18: *sub t. 1493.* 1832. *Perilomia fruticosa* Cham. & Schlecht. Linnaea 5: 102. 1830, *non S. fruticosa* Desf. *nec Soyer-Willem.* *S. mociniana* Benth. Lab. Gen. & Sp. 442. 1834. *S. isocheila* Donn.-Sm. Bot. Gaz. 57: 426. 1914. *S. glabra* Leonard, Contr. U. S. Nat. Herb. 22: 715. 1917.

Moist forests, 800–2,700 m.; San Marcos; Huehuetenango; Sacatepéquez; Chimaltenango; Escuintla; Guatemala; Santa Rosa. Mexico; El Salvador; Costa Rica.

Erect often diffusely branched suffruitose herbs to about a meter tall. Stems minutely puberulent above, glabrescent below; leaves long petiolate, the petioles 1–4 cm. long, the blade ovate to lanceolate, acuminate, sinuate dentate, glabrous or minutely puberulent below, 4–10 cm. long (or even less); inflorescence a few-many-flowered raceme, the flowers alternate or opposite, bright red, puberulent, subtended with a soon deciduous linear-oblong bract; calyx 3.5–5 mm. long, puberulent, accrescent in fruit; corolla red, puberulent, 24–40 mm. long, arcuate, gradually dilated upward, the galea 4–6 mm. long; nutlets black, rugose.

Dr. Epling has maintained *S. mociniana*, *S. isocheila*, and *S. glabra* but we believe the characters used, in one case is an artifact of drying, in others minute and inconstant detail of pubescence and variations in corolla length.

Scutellaria lundellii Epling, Lilloa 4: 267. 1939.

Pine forest areas. Known only from British Honduras (type *Lundell 6867*).

Perennial herb from a woody underground stem, 2–5 dm. tall; the leaves ovate, obtuse, serrate, strigose pubescent with tapered and often segmented hairs, 2–3 cm.



FIG. 61. *Scutellaria longifolia*. A, branch, $\times 1$; B, flower from the side, $\times 2$; C, calyx, $\times 3$.

long, the lowermost leaves suborbicular, petioles about 5 mm. long; inflorescence racemose, the flowers not opposite, pedicels 5–6 mm. long; calyx at anthesis about 5 mm. long, strigose; corolla slender, arched, 25–30 mm. long, galea inconspicuous, obscurely puberulent; anthers and stigma exserted.

Scutellaria lutea Donn.-Sm. Bot. Gaz. 13: 76. 1888.

At 1,200–1,600 m.; endemic; Baja Verapaz (type from Santa Rosa, *Tuerckheim 1309*; also at Santo Tomás and Cuesta de Cachil near Salamá).

Plants densely and finely velutinous-pubescent throughout, erect or ascending, 60 cm. high or less, branched, glandular-pubescent above; leaves on petioles 5 mm. long or shorter, ovate or oblong-ovate, 1–2.5 cm. long, obtuse, narrowed or rounded at the base, crenate-serrate; racemes 2–3 cm. long, few-flowered, the bracts ovate-lanceolate, the upper ones entire; pedicels 3–6 mm. long; calyx 3–4 mm. long; corolla yellow, 2–2.5 cm. long, glandular near the base, 5 mm. broad in the throat, the lips subequal; nutlets 1 mm. long, black, granular.

Scutellaria orichalcea Donn.-Sm. Bot. Gaz. 14: 29. 1889. *S. pedicularis* Fernald, Proc. Am. Acad. 35: 563. 1900 (type from Chiapas).

Moist or wet, mixed forest, often on limestone, sometimes on rocks along streams, 1,500 m. or less; Petén; Alta Verapaz (type from Chajrax, *Tuerckheim 406*); Izabal; Quiché. Mexico (Chiapas, Oaxaca); British Honduras; Costa Rica.

An erect perennial herb 15–50 cm. high, the stems often numerous, slender, simple or branched, sometimes suffrutescent below, finely puberulent, the hairs incurved or upwardly curved; leaves thin, on petioles 1–3 cm. long, elliptic to ovate or lanceolate, 2–8 cm. long, acute to long-acuminate, rounded or broadly cuneate at the base, sinuate-serrate or subentire, sparsely villosulous or glabrate above, paler beneath, puberulent or short-vilosulous, especially on the nerves, often purplish beneath; flowers white, in rather few-flowered racemes 2–5 cm. long; calyx puberulent or glabrate, 3–4 mm. long in anthesis, in age 5 mm. long; corolla 19–24 mm. long, puberulent, the galea 4.5 mm. long, the tube slender, the lips often tinged with purple or green; lower stamens inserted 10–18 mm. above the base of the corolla tube; nutlets 1 mm. long, black, granular.

Originally the corolla was described as yellow, apparently in error.

Scutellaria purpurascens Swartz, Prodr. Veg. Ind. Occ. 89. 1788. *Clarinete* (fide Aguilar).

Moist or dry thickets or forest, frequently in rocky places, sometimes in pine forest, 240–2,000 m.; Chiquimula; Retalhuleu; Quiché; Quezaltenango. Costa Rica; Panama; West Indies; Colombia; Venezuela and Brazil.

Plants perennial, low, commonly 10–20 cm. high, the stems solitary or several, simple or sparsely branched, densely puberulent with curved hairs; leaves thin, on slender petioles commonly 1–2 cm. long, ovate to deltoid-ovate, 2–7 cm. long, subacute to rounded at the apex, rounded to cordate at the base, sinuate-crenate, sparsely pubescent above, glabrous beneath or nearly so except for the finely puberulent veins; floral bracts very small and narrow or the lowest leaflike; flowers generally few, in lax terminal racemes 2–6 cm. long, the pedicels 3–4 mm. long, densely puberulent; calyx 2–3 mm. long, sparsely puberulent; corolla blue to purple or violet, 10–15 mm. long, finely puberulent, the tube 3.5 mm. broad at the apex; nutlets brown, 1 mm. long, tuberculate.

Scutellaria racemosa Pers. *Syn. Pl.* 2: 136. 1807. *S. rumicifolia* HBK. *Nov. Gen. & Sp.* 2: 324. 1817.

Moist or wet thickets or in marshes, 1,800–2,200 m.; Huehuetenango; Quiché. Central and southern Mexico; Honduras; South America.

An erect or ascending, herbaceous perennial, the stems usually branched, very slender, 30–50 cm. long or longer, glabrous; leaves on petioles 1–5 mm. long, ovate to lanceolate, hastate-lobate, 1–3 cm. long, acute to rounded at the apex, acute to cordate at the base, entire, sparsely and minutely pubescent or usually glabrous; flowers very small and numerous, pale purple or purplish white, axillary, the pedicels 2 mm. long or less; calyx 2 mm. long, puberulent; corolla 3–4 mm. long, minutely pubescent, the tube short, the lips subequal; nutlets less than 1 mm. long, tuberculate.

This has much smaller flowers than any other Central American species.

Scutellaria seleriana Loesener, *Bull. Herb. Boiss.* 7: 568. 1899. *S. petenensis* Lundell, *Wrightia* 1: 60. 1945 (type from Petén, *Lundell 3614*).

At 300–2,400 m.; Petén; Zacapa (Sierra de las Minas); Huehuetenango (type from Uaxacanal, Distr. Nentón, *Seler 2799*); Quiché. Southern Mexico.

An erect perennial 10–50 cm. high, branched, the stems finely pubescent; leaves on petioles 5–12 mm. long, ovate or broadly ovate, 2–4.5 cm. long, obtuse or acute, narrowed or rounded at the base, sinuate-crenate or subentire, thinly villous above, pubescent and paler beneath; bracts small and orbicular or large and leaflike; inflorescence racemose or the flowers paired in the axils of the uppermost leaves, the bracts small to leaf-like, flowers purple to white; calyx densely pubescent; corolla 10–15 mm. long, puberulent, the tube 3 mm. broad at the apex; nutlets 1 mm. long, black, tuberculate.

This species is related to *S. havanensis* Jacq. of the West Indies and Florida. *S. gaumeri* Leonard and *S. saxicola* Brandegee certainly belong here and *S. macer* Epling may be another growth form.

STACHYS L.

References: Carl Epling, Preliminary revision of American *Stachys*, Repert. Sp. Nov. Beih. 80: 1-75. 1934.

Annual or perennial herbs, usually with soft and weak stems, erect, prostrate, or rarely scandent; leaves mostly petiolate, broad, generally ovate or oblong, usually with rather harsh pubescence; flowers purple, pink, or red, commonly in 3's in the axils of the uppermost leaves, the verticils usually distant and forming leafy or almost naked racemes or spikes; calyx turbinate in anthesis, in age campanulate or urceolate, the teeth deltoid or lanceolate, usually pungent-tipped; corolla tube cylindric, generally somewhat arcuate, slightly dilated above, glabrate within or pilose-annulate, the limb strongly bilabiate, the upper lip erect, concave, the lower one spreading, trifid; stamens didynamous, usually inserted at the middle of the corolla tube, exserted beneath the upper lip, rarely included in the tube; anthers 2-celled, the cells divaricate; style unequally bifid at the apex; nutlets smooth or verruculose, obovate.

Species about 200, widely dispersed in both hemispheres, in the American tropics found mostly in the mountains. One or two additional species are known from southern Central America and several from Mexico.

The three red-flowered species of *Stachys* to be found in Guatemala are very closely allied and perhaps would be better considered as variations of one species with some geographical and morphological bases. The Mexican *S. boraginoides* is a member of this complex.

Corolla tube 12-23 mm. long; corolla bright red or red-purple.

Pubescence of the stems of weak spreading hairs, these scattered over the whole surface of the stem; corolla bright red *S. coccinea*.

Pubescence of the stems of retrorse hairs, these confined to the angles.

Leaves acuminate; corolla bright red, the tube 18-23 mm. long ... *S. lindenii*.

Leaves obtuse or rounded at the apex; corolla purple, the tube 12-14 mm. long. *S. nubilorum*.

Corolla tube 2.5-11 mm. long; corolla never red.

Tube of the corolla 2.5-4 mm. long; plants annual *S. agraria*.

Tube of the corolla 5-11 mm. long; plants perennial.

Petioles of the stem leaves half as long as the blade or longer; blade truncate or cordate at the base; calyx lobes pungent or long acuminate.

S. guatemalensis.

Petioles of the stem leaves almost none; the blades not truncate nor cordate at the base; calyx lobes nor pungent nor long acuminate *S. calcicola*.

***Stachys agraria* Cham. & Schlecht. Linnaea 5: 100. 1830.**

Moist fields or open slopes or banks, most often a weed in gardens or other cultivated places or in waste ground, sometimes in oak forest, 1,300-2,500 m.; Alta Verapaz; Baja Verapaz; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Sololá; Quiché; Que-

zaltenango; San Marcos. Southern United States; Mexico; Honduras.

Plants annual, erect or more often decumbent or procumbent, often much branched, the stems rather stout, 40 cm. long or shorter, densely pilose with spreading hairs, often glandular-pubescent above; leaves slender-petiolate, usually ovate-oblong and 1.5–5 cm. long, rounded or obtuse at the apex, rounded or truncate at the base, crenate, sparsely or densely pilose on both surfaces with rather long, spreading hairs; verticils 6–12-flowered, remote, in the axils of reflexed or spreading foliaceous bracts; calyx 4–5 mm. long, densely pilose with spreading hairs, the teeth deltoid, acute and pungent-tipped; corolla pink or pale purple, the tube 2.5–4 mm. long, the upper lip 1–1.2 mm. long, the lower one 2–4 mm. long; stamens more or less exserted from the tube, the filaments hirtellous.

Stachys calcicola Epling, Bull. Torr. Bot. Club 71: 484. 1944.
Chancol.

Wet banks and meadows often on limestone formations, 2,900–3,400 m.; Huehuetenango (type, Steyermark 50266); Quezaltenango; Totonicapán; Sololá. Endemic in the high subalpine meadows of Guatemala.

Small procumbent or repent perennials, the stems 5–25 cm. long and rooting at the nodes, densely white pilose pubescent; leaves elliptic-ovate to obovate, very obtuse, crenate-serrate, both faces of the lamina sparsely to densely appressed pilose-pubescent, prominently venose below, subsessile or the petioles short, the blades 0.7–3 cm. long and 0.3–1.5 cm. broad; inflorescences 2–6-flowered verticillasters in the axils of the reduced upper leaves; calyx 4.5–6 mm. long, pilose outside, the tube 3–4 mm. long, the lanceolate-deltoid lobes not spinulose at the apex and about 3 mm. long; corolla about 6–9 mm. long, the tube 3.5–5 mm. long, the galea 4–6 mm. long, the trilobulate lower lip 4–5 mm. long; the stamens exserted from the corolla tube but shorter than the corolla lobes.

A distinctive species of the high Guatemalan mountains easily distinguished by the nearly sessile leaves broadly rounded at the apex and with prominent nervation on the lower surface. The species has been confused with the Mexican *Stachys eriantha* Benth.

Stachys coccinea Jacq. Pl. Hort. Schoenbr. 3: 18, t. 284. 1798.
Hierba del caporal (fide Aguilar); *hierba de Candelaria*.

Moist or wet, mixed or oak forest, often on moist shaded banks or along cliffs, 800–3,700 m.; Chiquimula; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southwestern United States; Mexico; Nicaragua.

Plants perennial, erect and a meter high or less or often weak and reclining, the stems rather stout but fragile, simple or branched, densely pilose with soft spreading hairs, sometimes glandular-pilose above; leaves thin, on long slender petioles,

deltoid-ovate to oblong-ovate, mostly 3–8 cm. long, obtuse or rounded to acute at the apex, rounded or cordate at the base, thinly to densely soft-pilose on both surfaces, paler and venose beneath, coarsely crenate or crenate-serrate; verticels mostly 6-flowered, usually remote; calyx tube in anthesis 3–7 mm. long, narrowly campanulate, somewhat accrescent in age, densely or sparsely pilose or glandular-pilose, the teeth deltoid to deltoid-lanceolate, acuminate, 1–4 mm. long, pungent-tipped; corolla bright red or scarlet, the tube 18–21 mm. long, the upper lip 6–8 mm. long, the lower one 9–14 mm. long; stamens included, the filaments villous; style glabrous.

Stachys guatemalensis Epling, Rep. Sp. Nov. Beih. 80: 34. 1934. *S. glechomoides* Epling, Bull. Torr. Bot. Club 71: 484. 1944. *Mejorana silvestre*.

Moist thickets, banks and hillsides, sometimes in marshy places, 900–1,500 m. or perhaps more; Alta Verapaz (type of *S. guatemalensis* is *Turckheim 8445*); Quezaltenango; Huehuetenango (type of *S. glechomoides* is *Steyermark 49789*); Chiquimula; Santa Rosa. Mexico (Chiapas); Honduras; Nicaragua.

A weak herb, probably perennial, the stems ascending or often prostrate and rooting, 50 cm. long or less, hispid-hirsute with long spreading hairs; leaves thin, slender-petiolate, rounded-ovate to oblong-ovate, 2–8 cm. long, obtuse, shallowly cordate or rounded at the base, crenate, thinly hirsute on both surfaces with very long, whitish, spreading hairs; verticils 6-flowered, few or numerous, forming short or elongate, usually much interrupted spikes, the bracts mostly small and reflexed; calyx campanulate, 4–6 mm. long, densely long-hirsute, the teeth deltoid-acuminate, pungent-tipped, the 3 posterior ones slightly longer; corolla pale purple or lavender, the tube 5–7 mm. long, the upper lip 4–4.5 mm. long, the lower one 5–6 mm. long; filaments hirsute; style glabrous.

This species has been reported commonly as *S. costaricensis* Briq. of which it may prove to be a synonym.

Stachys lindenii Benth. in DC. Prodr. 12: 467. 1848.

Moist or wet thickets or usually in dense mixed forest, 500–2,850 m.; Suchitepéquez; Quezaltenango; San Marcos. Southern Mexico.

A large, more or less scandent herb, often 2 m. long or more, the stems weak, brittle, acutely 4-angulate, aculeolate along the angles with pale bulbous-based recurved hairs; leaves thin, on long slender petioles, ovate or oblong-ovate, mostly 5–13 cm. long, acute or acuminate, most of them cordate at the base, crenate-dentate, hirsute on the upper surface, on the lower surface bearing numerous short retrorse bulbous-based hairs along the nerves and veins, otherwise almost glabrous; verticils 1–6-flowered, the flowers axillary or forming elongate spikes, the bracts small or large; calyx tube 6–7 mm. long in anthesis, pilose or often glabrous, the teeth 3.5–4.5 mm. long, deltoid-lanceolate, acuminate and pungent-tipped, usually widely spreading in age; corolla bright red or red-purple, the tube 18–23 mm. long,

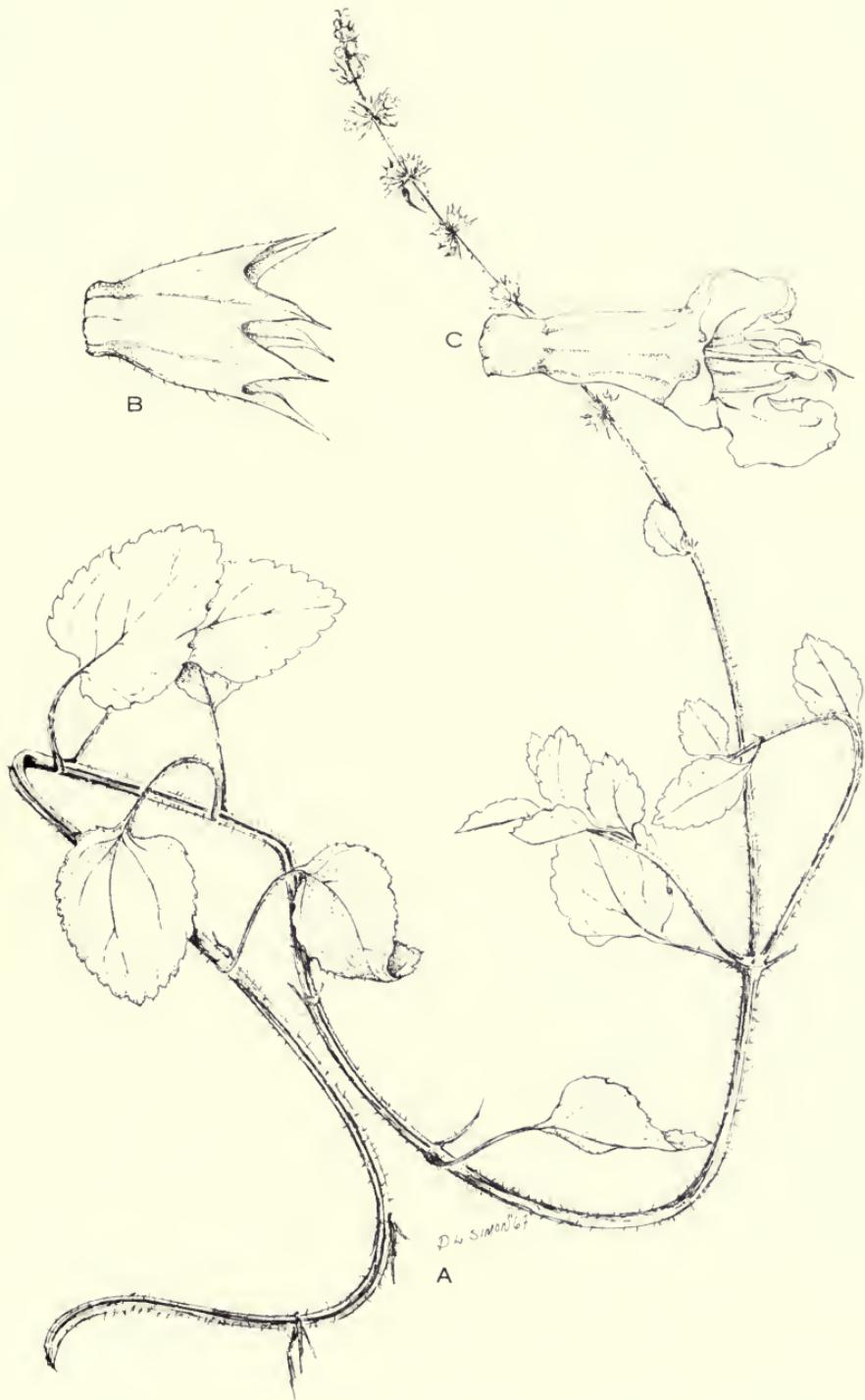


FIG. 62. *Stachys guatemalensis*. A, habit of plant, $\times \frac{1}{2}$; B, calyx, $\times 5$; C, corolla, $\times 5$.

the upper lip 6–7 mm. long, the lower one 12–14 mm. long; stamens included in the upper lip, the filaments villous; style glabrous.

This differs from all other Central American species in being usually a vine of some size, often forming dense tangles over shrubbery, frequently in association with such plants as *Tropaeolum* and *Cucurbitaceae*. The flowers are conspicuous and often rather showy, but the plant can hardly be considered a handsome one.

Stachys nubilorum Epling, Rep. Sp. Nov. Beih. 80: 48. 1934.

Moist or wet *Cupressus* forest, 2,400–2,800 m.; endemic; Chimaltenango (known only from the region of Santa Elena, Cerro de Tecán, the type being *Skutch 209*).

A branched herb, probably perennial, procumbent or somewhat clambering, the stems densely retrorse-pilose with slender white hairs on the angles; leaves thin, slender-petiolate, ovate or broadly ovate, 2–5 cm. long, obtuse or rounded at the apex, shallowly cordate at the base, rather coarsely crenate, long-pilose or hirsute on both surfaces with soft spreading hairs; verticils 3–6-flowered, in the axils of the upper leaves, these little reduced; tube of the calyx 4.5–5 mm. long at anthesis, densely and softly pilose, the teeth deltoid-acuminate, pungent-tipped, 2.5–3 mm. long; corolla bright purple, the tube 12–14 mm. long, the upper lip 5–7 mm. long, the lower one 8–10 mm. long.

Very closely allied to *S. coccinea* and perhaps only a variety of it.

TEUCRIUM L.

Reference: Elizabeth McClintock & Carl Epling, A revision of *Teucrium* in the New World, *Brittonia* 5: 491–510. 1946.

Mostly herbs, usually pubescent; leaves dentate, entire, or incised, the floral leaves similar to the caudine ones or reduced to bracts; verticils 2-flowered or rarely many-flowered, axillary or forming terminal spikes, racemes, or heads; calyx tubular or campanulate, rarely inflated, 10-nerved, 5-dentate, the teeth equal or the posterior one usually broader; corolla tube included in the calyx or rarely exserted, not annulate within, the limb almost unilabiate, produced anteriorly and spreading, the 2 posterior lobes with the very short lateral ones erect or usually declined, the middle lobe largest, narrow and entire or bifid or broad and concave; stamens 4, didynamous, the anterior ones longer, exserted between the posterior lobes of the corolla; anthers 2-celled, the cells divergent; style bifid at the apex, the lobes subulate, subequal; nutlets obovoid, reticulate-rugose.

About 100 species, widely distributed in both hemispheres, chiefly in temperate regions. No other species are known in Central America, although several others are in Mexico.

Corolla tube nearly twice as long as the calyx. *T. proctori*.
Corolla tube as long as the calyx. *T. ruscicarium*.



FIG. 63. *Teucrium vesicarium*. A, habit of plant, $\times \frac{1}{2}$; B, flower at anthesis from above, $\times 3$; C, inflated calyx, $\times 3$.

Teucrium proctori L. Wms. *Fieldiana, Bot.* 34. 114. 1972.

Probably open slopes, 1,900 m., near Nebaj, Dept. Quiché, (type, *Proctor 25498*). Endemic.

Tall herbs, the stems prominently quadrate and subalate, sparsely pubescent, the internodes 7–9 cm. long; leaves ovate, acuminate, the base obtuse or truncate, serrate, strigillose above, puberulent below, the blade 7–10 cm. long and 3–5.5 cm. broad, petiole 1–2.5 cm. long, puberulent; inflorescence terminal and terminal from lateral branches, spicate, open, about 15 cm. long; flowers rose-lilac, sessile or short pedicellate, subtending bract linear-lanceolate, acute, about 2 mm. long; calyx tubular puberulent, about 2.5–5 mm. long, vesicular when mature, 5 teeth triangular, acuminate; corolla tubular, the limb short, bilabiate, 5-lobate, about 5–7 mm. long, pilose at the throat within; stamens 4, didynamous, inserted near or above the middle of the tube; style about 4 mm. long, the stigma arched, verrucose; seeds about 3 mm. long.

Named for Dr. George R. Proctor, American botanist, long resident of Jamaica and student of the flora of that and other islands of the Caribbean.

Teucrium vesicarium Mill. *Gard. Dict.* ed. 8. no. 17. 1768. *T. inflatum* Swartz, *Prodr. Veg. Ind. Occ.* 88. 1788. *Mozote; verbena* (Petén).

Moist or wet thickets or fields, frequently in marshes, 1,650 m. or less; Petén; Alta Verapaz; El Quiché; Huehuetenango. Southern Mexico; British Honduras; Honduras; Nicaragua; Costa Rica; Panama; West Indies; South America.

A perennial herb, erect or ascending, sometimes a meter high but usually lower simple or sparsely branched, the stems obtusely tetragonal, densely pilose with spreading hairs; leaves thin, on long slender petioles, ovate to lance-ovate, 4–12 cm. long, acute or acuminate, shallowly cordate to rounded at the base, coarsely crenate, green above and puberulent or pilose, somewhat paler beneath, pilose, the nerves conspicuous; inflorescence spike-like, terminal, 5–20 cm. long, usually dense, the bracts lance-linear, acuminate; calyx campanulate, densely puberulent and also pilose with long spreading hairs, 5–7 mm. long, inflated, contracted at the mouth; corolla pale purple, 9–11 mm. long, pubescent; filaments pubescent below; nutlets 2–2.5 mm. long, rugose-reticulate, glabrous.

THYMUS L. Thyme

Perennial herbs or dwarf shrubs; leaves usually very small and entire; flowers small, purple, in terminal crowded verticils or in the leaf axils; calyx ovoid, villous in the throat, 10–13-nerved, bilabiate, the upper lip erect-spreading, tridentate, the lower lip bidentate, with long slender teeth; corolla purple or purplish, the upper lip erect, emarginate, the lower lip spreading, trifid; stamens 4, more or less didynamous, usually exserted; anthers 2-celled, the cells parallel or divergent; style bifid at the apex; nutlets ovoid or oblong, smooth.

About 50 species, all natives of the Old World.

Thymus vulgaris L. Sp. Pl. 591. 1753. *Tomillo; toronjil.*

Cultivated frequently in gardens of Guatemala; native of Europe.

A dwarf, densely branched shrub, generally 20–30 cm. high, woody almost throughout, the branches slender, reddish or purplish, puberulent with minute whitish recurved hairs; leaves often crowded, short-petiolate, elliptic to linear, 5–9 mm. long, obtuse, acute or obtuse at the base, entire, minutely puberulent or glabrate, conspicuously glandular-punctate; verticils of flowers 3–6-flowered, axillary; calyx 3–5 mm. long, hirtellous; corolla 4–6 mm. long, lilac or pink; nutlets 0.7–1 mm. long.

Thyme is the source of thymol and other oils. The plant is intensely fragrant, with a rather distinctive odor. It is employed in Guatemala principally in domestic medicine, and bunches of the dry branched or quantities of the dried leaves are sold in markets. It may be employed also for seasoning food.

Flora of Guatemala - Part IX, No. 4

SCROPHULARIACEAE

PAUL C. STANLEY AND LOUIS O. WILLIAMS

References: Thieret, John W., The Tribes and Genera of Central American Scrophulariaceae, *Ceiba* 4: 164-184, *illus.* 1954; John W. Thieret, Supraspecific Classification in Scrophulariaceae: A review, *Sida* 3: 87-106. 1967.

Herbs, shrubs or rarely trees (not in Guatemala); saprophytes or especially chlorophyll-bearing root parasites occur. Leaves opposite, verticillate or alternate, simple, dentate or incised, estipulate; inflorescences determinate or often indeterminate spikes or racemes, or the flowers solitary or fasciculate in leaf axils, usually subtended by bracteoles or bracts (these large and colored in *Castilleja*); flowers perfect, usually zygomorphic but some actinomorphic or nearly so; calyx with 5 or rarely fewer lobes, valvate or imbricate in bud; corolla gamopetalous, the tube long or almost none, the limb 4-5-(rarely 6-8)-lobed, usually bilabiate, the posterior lip entire, bilobate, or sometimes galeiform, the anterior lip trilobate, the base sometimes spurred; stamens 4 and didymous, or 2, inserted on the tube, alternate with the lobes, the fifth (adaxial) absent or represented by a staminode; filaments free; anthers 2-celled, with parallel, divergent or divaricate cells, dehiscent longitudinally, one cell sometimes abortive (*Buchnera*), the cells sometimes confluent at the apex; annular or lateral disc present or none; pistil 1, ovary superior, locules and carpels 2 (rarely 1), ovules numerous; style simple or divided into 2 lobes or lamellae terminal; fruit a capsule, rarely baccate, septicidal or occasionally loculicidal (rarely poricidal); seeds usually numerous, variously roughened, angled or winged, endosperm carnosae; embryo straight or curved.

A family of some 200 genera and perhaps 2,000 species, distributed over the earth but best represented in mountains of the temperate and tropical regions. Perhaps one or two more genera in southern Central America and in Mexico.

Both genera and species are sometimes difficult to distinguish. The genera may often be distinguished by sight but technical differences are difficult to define. Family distinctions are not always sharp or definite in families of the Tubiflorae related to the Scrophulariaceae, especially Solanaceae and Bignoniacaeae. The regular, usually plicate, corollas and bicollateral vascular strands separate the Solanaceae; the lack of endosperm separates the Bignoniacaeae, and those

Bignoniaceae with capsular fruits usually have flattened seeds with wings.

UNCOMMON CHARACTERISTICS IN GENERA OF SCROPHULARIACEAE IN GUATEMALA

Woody or suffrutescent stems occur in: *Eremogeton*, *Gibsoniothamnus*, *Hemichaena*, *Russelia*, *Schlegelia*, *Uroskinnera*.

Baccate fruits occur in: *Gibsoniothamnus*, *Leucocarpus*, *Schlegelia*.

Cymose inflorescences occur in: *Calceolaria*, *Gibsoniothamnus*, *Hemichaena*, *Leucocarpus*, *Penstemon*, *Russelia*, *Schlegelia*, *Tetranema*, *Uroskinnera*.

Filaments 5, one without anther, occur in: *Gibsoniothamnus*, *Penstemon*, *Schlegelia*, *Tetranema*, *Uroskinnera*. (*Tetranema* sometimes apparently without sterile filament.)

Flowers with only two anthers (or only two fertile anthers) occur in: *Calceolaria*, *Eremogeton*, *Gratiola*, *Lamourouxia**, *Lindernia**, *Micranthemum*, *Sibthorpia**, *Veronica*. Those marked * also may have four fertile anthers.

Flowers with five fertile anthers occur only in *Capraria*. (*Verbascum* not yet known from Guatemala has five fertile anthers).

Capsules containing elator-like hairs occur in all species of *Russelia*.

Posterior lip of corolla is or may be galeate in: *Castilleja*, *Lamourouxia*, *Pedicularis*.

Flowers resupinate *only* in *Alonsoa*. Dr. Ernst reports (in lit.) that he has found resupination in *Lamourouxia xalapensis*. We have not been able to verify this and do not believe that it occurs.

Alternate leaves (or the uppermost alternate) occur in about one-third of the genera to be found in Guatemala: *Angelonia*, *Buchnera*, *Capraria*, *Castilleja*, *Digitalis*, *Eremogeton*, *Gerardia*, *Maurandia*, *Pedicularis*, *Sibthorpia*, and *Veronica*.

Corolla with posterior lobes external in the bud (Subfam. Scrophularioideae). Capsule densely packed with hairs; red flowers in cymes (Tribe Russeliae) *Russelia*.

Capsule not densely packed with hairs.

Stigmas distinct (exceptions in *Limosella*, *Scoparia* and some *Bacopa*); seeds wingless, mostly simply reticulate, spirally or longitudinally furrowed (Tribe Gratiolae).

Leaves alternate; stamens 4-5; corolla nearly actinomorphic. *Capraria*.

Leaves opposite or verticillate; stamens 2 or 4 or variously reduced; corolla more or less zygomorphic.

Plants acaulescent; anther cells confluent..... *Limosella*.
 Plants caulescent; anther cells distinct.

Leaves pinnatifid; capsule linear; seeds spirally furrowed
Schistophragma.

Leaves not pinnatifid; capsule lanceolate to globose.

Anther cells stipitate.

Pedicels bracteolate at the base; corolla yellowish or white.
Bacopa.

Pedicels bracteolate at the apex or without bracts; corolla bluish or white..... *Stemodia*.

Anther cells not stipitate.

Fruit a loculicidal capsule or a berry; inflorescence racemose and pedicels without bracteoles or cymose and pedicels bracteolate.

Inflorescence of bracteolate cymes.

Fruit baccate, white at maturity..... *Leucocarpus*.

Fruit capsular, not white..... *Hemichaena*.

Inflorescence racemose; pedicels without bracteoles; calyx tube 5 angled..... *Mimulus*.

Fruit a septicidal, or septicidal-loculicidal capsule; inflorescence racemose, the pedicels bracteolate or not.

Corolla rotate, hirsute within at base, 4-lobate; stamens 4.
Scoparia.

Corolla neither rotate nor hirsute within at base, lobes 3, 4, or 5; stamens 2 or 4.

Anther cells parallel; pedicels bibracteolate or not; anterior filaments without knob-like processes.

Corolla yellow, lobes 5; sepals subequal; stamens 2, stamnodea 2; pedicels bracteolate..... *Gratiola*.

Corolla blue or white; sepals slightly or greatly unequal; stamens 4; bracteoles of pedicels present or absent
Bacopa.

Anther cells divergent; pedicels without bracteoles; anterior filaments often with knob-like processes.

Corolla 5-lobate, the narrow posterior lip much shorter than the spreading anterior lip; calyx 5-lobate; stamens 2 or 4..... *Lindernia*.

Corolla 4-lobate, 3 posterior lobes subequal, the anterior lobe longest; calyx obscurely 4-5 lobate; stamens 2.
Micranthemum.

Stigmas united (except *Uroskinnera*); seeds sometimes winged, not in *Bacopa*, *Lindernia*, or *Schistophragma*, longitudinally furrowed in *Calceolaria* and *Alonsoa*.

Filaments 5, the posterior antherless and reduced; inflorescence of bracteolate cymes or racemes (Tribe Cheloneae).

Epiphytic or perhaps terrestrial shrubs or lianas.

Corolla tubular not bilabiate, with lobes small and subequal; leaves of a pair unequal..... *Gibsoniothamnus*.

Corolla campanulate, bilabiate, the lobes large and unequal; leaves of a pair subequal..... *Schlegelia*.

Terrestrial herbs.

Inflorescence racemose; sterile filament well developed, subequal to or shorter than the posterior stamens..... *Tetranema*.

Inflorescence cymose; sterile filament well developed or much reduced.

Sterile filament much reduced; capsule loculicidal..... *Uroskinnera*.

Sterile filament well developed; capsule septicidal with entire or bifid valves..... *Penstemon*.

Stamens 4 or fewer, all anther bearing; inflorescence cymose only in *Calceolaria* (stamens 2).

Capsule loculicidal by distal ruptures or pores; corolla saccate or calcarate at the base (Tribe Antirrhineae).

Corolla gibbous or saccate at the base, throat open, or closed with a palate.

Leaves triangular-hastate, coarsely dentate or lobate; palate not closing throat of the corolla..... *Maurandya*.

Leaves linear to lanceolate, entire; palate closing throat of corolla. *Antirrhinum*.

Corolla calcarate at the base, throat nearly or quite closed. *Cymbalaria*.

Capsule septicidal or loculicidal by simple median split; corolla not calcarate at the base.

Corolla 6-8 cm. long, only slightly zygomorphic, the tube well developed; stamens 2; leaves alternate or subopposite; shrubs (Tribe Leucophylleae)..... *Eremogeton*.

Corolla strongly zygomorphic, the tube scarcely developed; stamens 2 or 4; leaves all or mostly opposite.

Stamens 4; corolla orange, salmon red, blue or violet, its lips not saccate nor concave; inflorescence racemose (Tribe Hemimerideae).

Corolla not resupinate, blue or violet, the tube not deeply split between the posterior lobes; seeds brownish, reticulate. *Angelonia*.

Corolla resupinate, orange, the tube split almost to the base between posterior lobes..... *Alonsoa*.

Stamens 2; corolla usually yellow, the lips concave or saccate; inflorescence cymose (Tribe Calceolarieae)..... *Calceolaria*.

Corolla with anterior lobes external in the bud (Subfam. Rhinanthoideae).

Posterior lobes of the corolla flattened or widely arching, often spreading; anthers all distinct.

Stigmas separate; capsule usually septicidal; (corolla 40-70 mm. long); sepals 5, the lobes ovate and distinct (Tribe Digitaleae)..... *Digitalis*.

Stigmas united; capsule loculicidal; sepals united, or only 4 lobes if distinct.

Corolla subrotate, the tube very short; capsule turgid or (usually) strongly flattened contrary to septum, often bilobate and as broad or broader than long; seeds not linear (Tribe Veroniceae).

Stamens 2; sepals (4 or 5), distinct; seeds flattened, both sides plane or one side convex, smooth to rugose; leaves not deeply cordate *Veronica*.

Stamens 3-5; sepals 4-5 united into a campanulate calyx; seeds turgid, often concave on one side and convex on the other; leaves deeply cordate..... *Sibthorpia*.

Corolla salverform or campanulate; capsule neither strongly flattened nor bilobate, as long or longer than broad; testa reticulate or seeds linear (Tribe Gerardieae).

Stamens with only one anther cell developed; corolla salverform, the tube to 1.5 cm. long; calyx tubular, less than 10 mm. long..... *Buchnera*.

Stamens with both anther cells developed; corolla campanulate or if salverform then the tube 8 cm. or more long; calyx campanulate or tubular.

Corolla salverform; calyx tubular; seeds linear in an ellipsoidal capsule. *Escobedia*.

Corolla campanulate or subcampanulate; seeds not linear, or if so then the capsule subglobose.

Leaves lanceolate or broader, dentate or subentire; calyx about 20 mm. long, accrescent in fruit or if smaller slightly accrescent and hispid; corolla yellow or white; seeds linear.

Corolla white and obviously exserted from calyx; calyx about 20 mm. long..... *Melasma*.



FIG. 64. *Alectra aspera*. A, habit, $\times \frac{1}{2}$; B, mature calyx and capsule, $\times 3$; C, pistil, $\times 4$; D, flat hair from stem, $\times 25$.

Corolla yellow, nearly or quite included in the calyx; calyx 6-8 mm. long. *Alectra*.

Leaves linear or subulate, entire or nearly so; calyx neither greatly accrescent nor hispid; corolla purple, pink or white; seeds not linear. *Gerardia*.

Upper lobes of the corolla narrowly arched forming a galea that encloses the anthers; anthers frequently cohering; often root parasites (Tribe Euphrasiaeae).

Leaves opposite and *not* chiefly radical; anther cells usually calcarate at the base, woolly. *Lamourouxia*.

Leaves alternate or the lowest opposite, often mostly radical.

Anther cells unequally placed; anterior corolla lip small and much exceeded by the galea; floral bracts often red, yellow or white. *Castilleja*.

Anther cells equally placed; anterior corolla lip subequal to the galea in length; floral bracts green. *Pedicularis*.

ALECTRA Thunberg

Erect annual herbs, scabrous pubescent or hispid. Leaves opposite, reduced upward, dentate or somewhat laciniate at the base; inflorescence spike-like and often elongated with the flowers in the axils of the upper leaves; peduncles very short with 1-2 bracteoles at the apex, or naked; calyx campanulate, 5-lobate to about the middle; corolla subcampanulate or subglobose, the limb oblique and 5-lobate; stamens of two unequal pairs, the anther often barbate dorsally, mucronulate or aristate at the base; style elongate, inflexed, the apex entire or somewhat bifid and thickened; seeds clavate.

A genus with only one species in our area and that possibly introduced. Closely related to *Melasma*.

Alectra aspera (Cham. & Schlecht.) L. Wms. *Fieldiana, Bot.* 34: 118. 1972. *Pedicularis melampyroides* L. C. Rich. *Act. Soc. Hist. Not. Par.* 1: 111. 1792, non *Alectra melampyroides* Benth. in DC. *Prodr.* 10: 339. 1846. *Glossostylis aspera* Cham. & Schlecht. *Linnaea* 3: 22. 1828. *Alectra brasiliensis* Benth. in DC. l. c. *Melasma melampyroides* Pennell, N.Y. Acad. Sci. 6: 188. 1925.

In savannas or pastures and old fields, 200 m. or less. Alta Verapaz. British Honduras. Nicaragua. Panama. West Indies and southward to Brazil.

Erect annual plants, scabrous hirsute, 30-75 cm. tall, simple or branched; leaves sessile or nearly so, narrowly triangular-lanceolate, dentate, attenuate or acuminate, truncate or subcordate at the base, 2-5 cm. long; flowers solitary and sessile in the leaf axils, forming long leafy-bracteate terminal spikes; calyx campanulate, densely hispid, up to about 8 mm. broad; corolla almost or quite included in the calyx, yellow.

The species has been reported from Guatemala by Hemsley. We suspect that the plant was introduced quite recently into Central America as a weed. It is a plant of unpleasant and unattractive appearance, like so many members of the family.



FIG. 65. *Alonsoa meridionalis*. A, habit, $\times \frac{1}{2}$; B, part of flowering inflorescence, $\times 1$; C, part of fruiting inflorescence, $\times 1$; D, capsule $\times 2$; E, seed, $\times 7\frac{1}{2}$; F, leaf bases, $\times 2\frac{1}{2}$.

ALONSOA Ruiz & Pavón

Large herbs, often much branched, glabrous except in the inflorescence, the stems tetragonal; leaves mostly opposite or ternate, serrate or entire, the floral leaves alternate; flowers small and inconspicuously colored, in glandular-puberulent terminal racemes, the pedicels solitary, not bracteolate; calyx 5-parted, the lobes narrow; corolla by twisting of the pedicel resupinate, explanate-rotate, the tube almost obsolete, the limb 5-lobate, the 2 posterior lobes free almost to the base, the lateral lobes short and broad, the anterior lobe largest, scarcely concave; perfect stamens 4, the filaments short, the anthers oblong, the cells close together or divergent, confluent at the apex; style capitate-stigmatose at the apex, entire; ovules numerous in each cell; capsule ovate or oblong, obtuse, compressed, septically bivalvate, the valves entire or bifid; seeds numerous, small, punctate-rugose.

A small genus of perhaps four or five not very distinctive species. Only the following one occurs in Central America.

Alonsoa meridionalis (L. f.) Kuntze, Rev. Gen. Pl. 2: 457. 1891.
Serophularia meridionalis L. f. Suppl. 280. 1781.

Wet thickets or mixed forest, 1,500–3,200 m.; Jalapa; Sacatepéquez; Chimaltenango; Quiché; Sololá; Totonicapán; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; El Salvador; Honduras; Costa Rica; Panama; western South America.

An erect herb, usually a meter high, much branched, the stems glabrous or nearly so, tetragonal, usually narrowly winged on the angles; leaves slender-petiolate, often with clusters of very small leaves in their axils, ovate-oblong or lance-oblong to ovate, mostly 5–10 cm. long, acute, obtuse at the base, often abruptly contracted and decurrent, finely or coarsely serrate or dentate with sharp-pointed teeth, thin, glabrous; flowers in long leafy-bracteate racemes, the pedicels slender, usually glabrous, equaling or exceeding the bracts, upcurved in fruit; sepals 4 mm. long, somewhat larger in fruit, lanceolate, generally glabrous; corolla 10 mm. long, orange or salmon-red; capsule 9–10 mm. long, narrowly ovoid, attenuate to the apex; seeds black, the furrows almost as wide as the intervening ridges.

This has been reported from Guatemala as *A. caulialata* Ruiz & Pavón, and as *A. serrata* Pennell, the first from Peru, the second from Colombia. Both are perhaps synonymous with *A. meridionalis*.

ANGELONIA HBK.

Annual or perennial herbs, glabrous, pilose, or viscid-pubescent. Leaves opposite or the uppermost alternate, usually narrow and dentate; peduncles 1-flowered, ebracteate, axillary or in elongate terminal racemes; calyx 5-fid, the lobes narrow; corolla tube almost obsolete, the limb bilabiate, the 5 lobes spreading, rounded, the 2 posterior ones outermost in bud, the throat ampliate below the anterior lip into a broad obtuse sac, appendaged within in the throat; stamens 4,

didynamous, the filaments short, the anther cells distinct, divaricate; style capitate-stigmatose at the apex; ovules numerous in each cell; capsule globose or ellipsoid, bivalve, the valves entire; seeds obovoid or angulate-cuneate, the testa lax, hyaline-membranaceous, foveolate.

About 25 species, in tropical America. Only the following are known in Central America.

Leaves long-acuminate or attenuate at the apex, glabrous or nearly so, narrowed at the base. *A. angustifolia*.
 Leaves obtuse or subacute, copiously villous with long weak hairs, broad and often more or less clasping at the base. *A. ciliaris*.

Angelonia angustifolia Benth. in DC. Prodr. 10: 254. 1846.

Moist margins of savannas, little above sea level; Izabal; Chiquimula. Southern Mexico; often cultivated for ornament in Guatemala and in other parts of Central America.

Plants probably perennial, a meter high or less, simple or branched, glabrous throughout or nearly so; leaves narrowly lanceolate, 5–10 cm. long, acuminate or attenuate, narrowed to the base, remotely or closely serrate, sessile or nearly so; flowers in long leafy-bracted racemes, the pedicels slender, upcurved, mostly longer than the subtending leaves; corolla 1.5–2 cm. in greatest breadth, dark lilac or violet with a white throat; capsule globose, 5–6 mm. in diameter, glabrous.

Known in Yucatan as “xacxiu” (Maya) and “boca de la vieja.”

Angelonia ciliaris Robinson, Proc. Am. Acad. 45: 400. 1910.

Moist or wet, open places, at or little above sea level; Petén; British Honduras (type from Sibun River, *M. E. Peck* 417); Nicaragua.

Plants perennial, erect, 30–60 cm. high, stems simple or sparsely branched, obtusely tetragonal, long-ciliate on the angles; leaves sessile, oblong-lanceolate or spatulate-oblong, 2–5 cm. long, obtuse or acute, broad and often clasping at the base, laxly villous above, ciliate beneath on the costa, serrate; floral leaves broadly ovate, subcordate; pedicels usually longer than the subtending leaves, glabrous, recurved at the apex; calyx lobes lanceolate, acuminate, 3.5 mm. long; corolla about 1 cm. broad, blue or lavender; capsule globose, 5 mm. in diameter.

ANTIRRHINUM Linnaeus, Snapdragon

Annual or perennial herbs; leaves alternate, usually narrow and entire, or the lowest leaves opposite; flowers commonly large and showy, in terminal racemes or solitary in the upper leaf axils; calyx 5-parted, the lobes imbricate; corolla very irregular, gibbous or saccate at the base, bilabiate, the upper lip erect, bilobate, the lower lip spreading, trilobate, its base produced into a palate, this nearly or quite closing the throat; stamens 4, didymous, included, the filaments filiform, or dilated at the apex; style filiform; capsule ovoid or globose, opening below the apex by chinks or pores; seeds numerous, oblong, truncate, rugose or smooth, not winged.



FIG. 66. *Angelonia ciliaris*. A, habit, $\times \frac{1}{2}$; B, flower from side, $\times 3$; C, flower from front, $\times 3$.

There are about 40 species, chiefly in temperate regions of western North America and of the old world. None are native in Central America but several occur in Mexico.

Antirrhinum majus L. Sp. Pl. 617. 1753. *Dragón; boca de dragón.*

Native of Europe; planted widely as an ornamental and commonly grown in gardens in Guatemala.

An erect perennial, glabrous below, usually glandular-pubescent above, the stems branched or simple, commonly 40–75 cm. tall; leaves lanceolate to linear or oblong-lanceolate, short petiolate, entire, acute at each end, 2.5–7 cm. long; flowers large and showy, various in color, mostly in shades of purple, red, yellow, or white; pedicels stout, erect in fruit; calyx lobes oval or ovate, obtuse, 4–6 mm. long; corolla about 4 cm. long, but variable in size; capsule oblique-ovoid, 8–10 mm. long, opening by 2 pores below the summit.

The snapdragon is a favorite in Guatemalan gardens and does especially well in gardens and parks at middle elevations. Good displays are often to be seen in the parks in Guatemala City. In Costa Rica this plant is called "boca de león."

BACOPA Aublet

Herbs, erect or prostrate, mostly growing in wet soil, glabrous or pubescent, often punctate; leaves opposite, often fleshy, entire, dentate, or dissected; flowers axillary, solitary in the leaf axils and sessile or pedicellate, sometimes fasciculate, small, mostly white or yellow, sometimes forming terminal racemes; pedicels 1–2-bracteolate or naked; calyx 5-parted, the segments imbricate, the posterior one sometimes much larger than the others, the innermost ones often very narrow; corolla tube cylindric, the limb bilabiate, the lips spreading, the upper one exterior in bud, emarginate or bilobate, the lower lip trilobate; stamens 4, didynamous, included; anthers approximate by pairs or distant, the cells contiguous and parallel, or divergent; style dilated at the apex, entire or shallowly bilobate, the stigma terminal; ovules numerous; capsule globose or ovoid, bisulcate, loculicidally and usually septicidally dehiscent; seeds small, numerous.

A genus of some 60 species, in both hemispheres but mostly in America. There has been no monographic study of Bacopa and one is much needed. Many of these species are perhaps more wide ranging than we have recognized here and it is possible that older names may apply to them.

Leaves dissected into numerous filiform lobes.....*B. naias.*
Leaves entire or dentate.

Flowers long-pedicellate, the pedicels much longer than the calyx; leaves usually entire.

Leaves conspicuously dentate; corolla yellow.....*B. procumbens.*
Leaves entire; corolla white or purple.

Leaves clasping at the base; stems densely pilose with long spreading hairs; outer sepals cordate at the base. *B. salzmannii*.

Leaves narrowed at the base, not clasping; stems glabrous or sparsely pilose with short hairs; sepals not cordate at the base.

Sepals 2.5–3 mm. long; plants usually aquatic; leaves rounded-obovate *B. repens*.

Sepals 5–6 mm. long; plants terrestrial, creeping; leaves obovate-oblong or narrowly cuneate-obovate. *B. monnierii*.

Flowers sessile or nearly so, the pedicels shorter than the calyx, or the flowers sometimes long-pedicellate but the leaves then conspicuously dentate.

Sepals 5–9 mm. long; plants usually tall, often 50–60 cm. high, the stems glabrous. *B. lacertosa*.

Sepals 2–4 mm. long.

Stems pubescent; plants less than 20 cm. tall.

Sepals about 2 mm. long, densely punctate, 1-nerved. *B. parviflora*.

Sepals about 4 mm. long, not punctate, several-nerved. *B. axillaris*.

Stems glabrous; plant more than 20 cm. tall. *B. sessiliflora*.

Bacopa axillaris (Benth.) Standl. Journ. Wash. Acad. Sci. 15: 460. 1925. *Herpestis axillaris* Benth. in DC. Prodr. 10: 396. 1846. *Caconapea axillaris* Pennell, Proc. Acad. Nat. Sci. Phila. 72: 152. 1920.

In wet soil about pool, 1,500 m.; Chiquimula (southeast of Concepción de las Minas, Steyermark 31170). Panama; Colombia.

Plants erect, branched from the base, 20 cm. high or less, the stems thick and spongy, stout, thinly villous with pale spreading hairs; leaves oblong-lanceolate or linear-lanceolate, 2.5–3.5 cm. long, acute, sessile, narrowed to the base, obtusely serrate, 1-nerved, glabrous, densely punctate beneath; flowers subsessile, densely crowded in the leaf axils, minutely 1–2-bracteolate; outer sepals green, equaling the corolla, oval or broadly elliptic, 4 mm. long, obtuse or usually rounded at the apex, conspicuously several-nerved, ciliate, otherwise glabrous, not punctate.

No authentic material of this species has been seen and no other collection of it has been recorded north of Panama. Standley in *Flora of the Panama Canal Zone* says that the plant is common there. The specimen cited above agrees with Bentham's original description.

Bacopa lacertosa Standl. Field Mus. Bot. 11: 140. 1932.

Open marshes or bogs, at or little above sea level; British Honduras (type from All Pines, W. A. Schipp 763); Mexico.

Plants erect, perennial, mostly 50–60 cm. high or taller, the stems stout, simple or sparsely branched, glabrous or sometimes short-villosulous above; leaves fleshy, spreading, sessile, linear or linear-lanceolate, 3–7 cm. long, 2–15 mm. broad, acute or attenuate, gradually attenuate to the base, crenate-serrate, glabrous, densely and minutely punctate; flowers axillary, solitary or fasciculate, the pedicels 1 cm. long or less, bracteolate above the middle; sepals very unequal, the 3 outer ones subfoliaceous, broadly ovate, 7–9 mm. long, acute or obtuse, rounded at the base or truncate, several-nerved, ciliate, puncticulate, sparsely pilosulous outside or



FIG. 67. *Bacopa lacertosa*. A, habit, $\times \frac{1}{2}$; B, flower from side, $\times 5$; C, corolla dissected to show lobing and stamens, $\times 4$.

glabrate; corolla white, scarcely longer than the sepals; capsule ovoid, 4 mm. long, attenuate at the apex, enclosed by the sepals.

Critical studies of the *Bacopas* may indicate that this one is a synonym of *B. aquatica* Aubl.

Bacopa monnieri (L.) Wettst. in Engler & Prantl, Pflanzenfam. IV. 3b: 77. 1891. *Lysimachia monnieri* L. Cent. Pl. 2: 9. 1756. *Herpestis monnieri* HBK. Nov. Gen. & Sp. 2: 366. 1818. *Verdolaga amarga*.

Wet fields or waste ground, often in mud or sand along stream beds, 1,200 m. or less; Izabal; Zacapa; Chiquimula; El Progreso; Jutiapa; Guatemala. Southeastern United States; Mexico. British Honduras to El Salvador and Panama; West Indies; South America; Old World tropics.

Plants very succulent, perennial, glabrous or nearly so, branched, the stems prostrate and rooting, 50 cm. long or shorter, often forming dense mats; leaves cuneate-oblong or cuneate-obovate, sessile, rounded at the apex, attenuate to the base, entire, 6-20 mm. long, punctate; pedicels mostly in alternate leaf axils, bibracteolate at the apex, in fruit or sometimes in anthesis longer than the leaves; sepals 6-7 mm. long, ovate, green, the outer ones obtuse or subacute, obtuse or rounded at the base, glabrous; corolla lilac or purple, 8 mm. long, obscurely bilabiate; capsule ovoid, acute, shorter than the calyx.

Called "verdolaga" in El Salvador; the Maya name of Yucatan is reported as "yaaxcach." An inconspicuous and somewhat weedy plant, especially frequent on sand and gravel bars along streams. The specific name has been written *monnieria* and *monniera*, here regarded as mere variants of *monnieri*.

Bacopa naias Standl. Field Mus. Bot. 11: 141. 1932.

Known only from the type, in swampy places, All Pines, British Honduras, at sea level, W. A. Schipp 610.

A perennial aquatic herb, the stems about 30 cm. long, ascending, simple, striate, densely leafy, the nodes short, the upper ones sparsely and minutely puberulent; leaves sessile, amplexicaul, 1 cm. long, 3-parted, divided into very numerous, linear or filiform, flaccid segments; flowers solitary in the leaf axils, the slender pedicels 2.5-6 mm. long, sparsely puberulent or almost glabrous, reflexed in fruit, bibracteolate; sepals green, linear, subobtuse, 3 mm. long; corolla blue, with a yellow throat, 4 mm. long; capsule oblong, 2 mm. long.

This is presumably an aquatic plant, partly or almost wholly submerged in water. Closely related to *Bacopa reflexa* (Benth.) Edwall of South America.

Bacopa parviflora Standl. ex L. Wms., Fieldiana, Bot. 34: 118. 1972.

In shallow water about margins of pools, 1,500 m.; Chiquimula (southeast of Concepción de las Minas, Steyermark 31169). Honduras; Nicaragua; Panama.

Plants probably annual, erect, mostly less than 20 cm. high, sparsely or abundantly branched, the stems stout and spongy, short-villous or glabrate; leaves sessile, linear-lanceolate, 2-3 cm. long, acute, broad and somewhat clasping at the base, obscurely serrulate or subentire, glabrous or nearly so, densely punctate beneath; flowers sessile or very shortly pedicellate, densely fasciculate in the leaf axils, minute; calyx green, 2 mm. long, the lobes elliptic or oblong-ovate, obtuse or subacute, glabrous, densely and conspicuously punctate, 1-costate; corolla scarcely exceeding the calyx.

Bacopa procumbens (Mill.) Greenm. Field Mus. Bot. 2: 261. 1907. *Erinus procumbens* Mill. Gard. Dict. ed. 8. no. 6. 1768. *Herpestis chamaedryoides* HBK. Nov. Gen. & Sp. 2: 369. 1818. *Mecardonia procumbens* Small, Fl. S. E. U. S. 1065, 1338. 1903. *Bacopa chamaedryoides* Cook & Coll. Contr. U.S. Nat. Herb. 8: 88. 1903. *Hierba té.*

Moist fields or banks, often in waste ground about dwellings or along roadsides, frequent on sand and gravel bars along streams, sometimes in moist or wet thickets, rarely in oak-pine forest, 2,000 m. or less; Petén; Alta Verapaz; Baja Verapaz; El Progreso; Zacapa; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Chimaltenango; Quiché; Huehuetenango; Suchitepéquez; Sololá; Retalhuleu; Quezaltenango. Florida; Mexico; British Honduras to El Salvador and Panama; West Indies; South America.

Plants annual or perennial, glabrous, branched from the base, prostrate to suberect, the stems mostly 30 cm. long or less; leaves short-petiolate, ovate or oval, mostly 8-15 mm. long, rounded to acute at the apex, acute at the base, serrate, usually blackening when dried; pedicels slender, mostly longer than the leaves; sepals green, the outer ones in age 8-10 mm. long, ovate, subacute, obtuse at the base, glabrous; corolla bright yellow, about 1 cm. long; capsule oblong, 6-10 mm. long.

Called "trencilla" in El Salvador; "xacanlum," "xnocac" (Yucatan, Maya). Often a weedy plant in the lowlands of Central America and rather conspicuous because of the bright yellow flowers. The plants have been found once around the fumeroles on the summit of Volcán de Atitlán at about 3,500 m., much above its normal elevation.

Bacopa repens (Swartz) Wettst. in Engler & Prantl, Pflanzenfam. IV. 3b: 76. 1891. *Gratiola repens* Swartz, Prodr. Veg. Ind. Occ. 14. 1788. *Herpestis repens* Schlecht. & Cham. Linnaea 5: 107. 1830.

Partly submerged in shallow water of lakes and ponds, or in open marshes or swamps, 1,800 m. or less; Petén; Zacapa; Jutiapa; Huehuetenango. Mexico; British Honduras; Honduras; Panama; West Indies; South America.

Plants probably perennial, glabrous or sparsely short-pilose, the stems simple or branched, fistulose, 40 cm. long or shorter, floating in water or procumbent and rooting at the nodes; leaves sessile, rounded-ovate, 8–20 mm. long, rounded at the apex, obtuse or broadly cuneate at the base, entire, glabrous; pedicels very slender, shorter than the leaves, mostly solitary, reflexed in fruit; sepals 3 mm. long, the outer ones ovate, the inner ones lanceolate; corolla blue or white, little longer than the calyx; capsule 3–4 mm. long, membranaceous.

This has been reported from the region as *B. rotundifolia* (Michx.) Wettst., a species of the United States closely similar in general appearance, but differing in floral details.

Bacopa salzmannii (Benth.) Wettst. ex Edwall, Bol. Comm. Geogr. São Paulo 13: 176, 181. 1897. *Herpestis salzmanni* Benth. in Hook. Comp. Bot. Mag. 2: 58. 1836.

Floating in shallow water of ponds, or in bogs or marshes, 800–1,500 m.; Alta Verapaz; Chiquimula; Jutiapa; Quiché. Southern Mexico; Honduras; Nicaragua; Costa Rica; Panama; southward to Brazil.

Plants annual or perennial, floating in water or creeping in wet soil, the stems simple or branched, thick and succulent, villous with long spreading hairs, usually densely so; leaves rounded-ovate, amplexicaul, rounded or very obtuse at the apex, entire, glabrous or villous beneath, palmately several-nerved, mostly 8–15 mm. long; pedicels usually longer than the leaves, ebracteate; calyx green, 4–5 mm. long, the outer segment broadly cordate, very obtuse, long-ciliate, nerves prominent, lateral lobes linear-lanceolate, ciliate, about 3–3.5 mm. long; corolla white or blue, 8 mm. long.

Bacopa sessiliflora (Benth.) Pulle, Enum. Pl. Surinam 415. 1906. *Herpestis sessiliflora* Benth. Comp. Bot. Mag. 2: 58. 1836.

In moist or swampy places near sea level. British Honduras; Nicaragua; Panama. Northern South America.

Marsh plants up to about 3 dm. tall, completely glabrous, the stems terete and apparently somewhat fistulose below. Leaves opposite, linear-ob lanceolate, obtuse, serrulate above the middle, 1.5–4 cm. long and 0.2–0.4 cm. broad, glandular-punctate on both surfaces; inflorescence axillary or spicate with nearly sessile flowers in the axils of leaves or bracts, often with lateral spikes and abundant flowers, pedicel almost none, bibracteolate with short subulate bracteoles 1–1.5 mm. long; calyx 5-lobate, 3 outer lobes in anthesis ovate or lanceolate-ovate, obtuse, about 3.5 mm. long, 2 inner lobes lanceolate or linear-lanceolate, acuminate, about 2 mm. long and 0.4 mm. broad, becoming somewhat accrescent and venose

at maturity, to 4-4.5 mm. long; corolla white, tubular-campanulate, obscurely bilabiate, about 3.5 mm. long; anthers 4, the short filaments attached near center of corolla; style simple, bilobulate at the apex, about 1 mm. long; capsule narrowly ovoid, slightly compressed, about 3.5 mm. long, seeds oblong, reticulate longitudinally, 0.3-0.35 mm. long.

A single specimen is known from our area (*Gentle 9439, LL*) and the description is drawn from it.

EXCLUDED.

Bacopa sp.

Jutiapa: open marsh between Jutiapa and La Burrera, alt. 800-850 m., *Standley 76003*.

This specimen was determined by Dr. Standley as *Bacopa stricta* (Schrad.) Wettst. and included in the preliminary manuscript of this flora on the basis of the specimen. This specimen is old and may be only an unusual form of *B. salzmannii* or it may be a species not yet recognized in Mexico or Central America.

Bacopa sp.

Huehuetenango: small lake on plain about 6 km. west of Huehuetenango, alt. about 1,800 m., *Standley 81619*.

The specimen determined by Standley as *B. repens* (Sw.) Wettst. The material is inadequate but more closely allied to *B. salzmannii*, it is not that species, however.

BUCHNERA Linnaeus

Reference: D. Philcox, Revision of the New World Species of *Buchnera* L., Kew Bull. 18: 275-315, illus. 1965.

Plants erect, annual to perennial, blackening in drying, hispid or scabrous, rarely glabrous; leaves opposite or the upper ones sometimes alternate, usually narrow and often dentate; inflorescence a terminal bracteate spike, flowers blue or white, remote or crowded in the inflorescence; calyx tubular, 5-dentate, 5-10-nerved, the lobes equal or not and much shorter than the tube; corolla salverform, the tube cylindric, slightly curved, the limb subequal to the tube, 5-lobate, spreading, the anterior lobes external in the bud; stamens 4, didynamous, anther cells confluent at the apex; style slender, thickened or clavate above, the small stigma entire or emarginate; capsule loculicidally dehiscent; seeds many, small, reticulate.

A small genus of perhaps 100 species of which about 15 are in the New World. One or two others are to be found in southern Central America and Panama. The key which follows, a rather weak one, will indicate that the species are not abundantly distinct.

Corolla tube pilose externally; calyx pubescent on and between the nerves.
 Calyx 4-5 mm. long; capsule exceeding the calyx. *B. floridana*.
 Calyx about 6 mm. long; capsule about as long as the calyx. *B. obliqua*.
 Corolla tube glabrous externally; calyx glabrous between the nerves.
 Plants glabrous or obscurely scabrid or sparsely pubescent. *B. palustris*.
 Plants scabrid hispidulous throughout. *B. pusilla*.

Buchnera floridana Gandoger, Bull. Soc. Bot. France 66: 217. 1919; Philcox, Kew Bull. 18: 304, *fig.* 1965.

Lowland savannas at 300 m. or less; Petén. Southeastern United States, West Indies, British Honduras to Trinidad. A single collection is known from British Honduras (*Lundell 4866*) and from Guatemala (*Tún 918*).

Annual or biennial herbs to 60 cm. tall, the stems pilose-scabrid to subglabrous. Leaves linear-lanceolate or broader below, hispid on both faces; inflorescence open, 3-7 cm. long, bracts ovate, about 3 mm. long, the bracteoles narrower and shorter; calyx 4-5 mm. long, pubescent or glabrescent; corolla about 8-10 mm. long, the tube slender, externally pilose, the lobes broadly obovate, 2-5 mm. long; capsule exceeding the calyx at maturity, about 6 mm. long.

Buchnera obliqua Benth. in DC. Prodr. 10: 498. 1846; Philcox, Kew Bull. 18: 301, *fig.* 1965.

Lowland savannas to the highland oak-pine forests, 1,600 m. or less; Alta Verapaz; Santa Rosa. United States (Arizona); Mexico; and Ecuador.

Plants slender, 75 cm. tall or less, simple or with a few branches, the stems hispidulous with slender spreading white hairs; radical leaves short, obovate, obtuse at the apex, the stems leafy to the inflorescence, the caudine leaves linear or lance-linear, 2-4.5 cm. long, acute, sessile or short-petiolate, attenuate to the base, 1-3-nerved, entire or remotely dentate, scabrous-hispid; racemes long and slender, usually many-flowered, the flowers remote, at least in age, sessile; bracts subulate, often longer than the calyx; calyx about 6 mm. long, tubular in anthesis, tumid in fruit, scabrid-hispidulous on and between the nerves, the teeth short, triangular, acute or acuminate; corolla usually purple or blue, the tube about 8 mm. long, pilosulose; capsule oval, glabrous, 6 mm. long.

This species is reported from Guatemala on a single specimen (*Heyde & Lux 4011*) which we have not seen. The differences between *B. obliqua* Benth. and *B. pusilla* HBK. are minor and it is possible that the Guatemalan material is in reality only one species.

Buchnera palustris (Aubl.) Spreng. Syst. 2: 805. 1825; L. Wms. Fieldiana, Bot. 34: 119. 1972. *Piripea palustris* Aubl. Pl. Guin. 2: 628, t. 253, 1775. *B. weberbaueri* Diels in Engler, Bot. Jahrb. 37: 430. 1906. *B. leiantha* Standl. Field Mus. Bot. 22: 105. 1940. *Flor del cielo*.



FIG. 68. *Buchnera pusilla*. A, habit of plants, $\times \frac{1}{2}$; B, flowering inflorescence, $\times 1$; C, fruiting inflorescence, $\times 1\frac{1}{2}$; D, seeds, $\times 20$; E, flower in natural position, $\times 6$; F, young ovary and dissected corolla to show lobes and stamens, $\times 6$; G, hairs from throat of corolla, much enlarged, H, stamens, $\times 18$.

Sandy pine uplands or possibly savannas. Izabal. British Honduras. Panama. Northern South America to Peru and Brazil.

Small annual herbs to 25 cm. or occasionally more, usually unbranched glabrous or sparsely puberulent. Leaves linear, erect, entire, glabrous or sometimes obscurely ciliate, 1-3 cm. long and 0.1-0.2 cm. broad; inflorescence spicate, elongate, loosely flowered, the bracts ovate, acuminate, about 3 mm. long; calyx cylindric, becoming somewhat campanulate with age, up to about 8 mm. long, lobes lanceolate, acute, ciliate or not, up to 2 mm. long; corolla tube slender, somewhat arcuate, to about 10 mm. long, the lobes ovate or obovate, obtuse, to 5 mm. long; capsule narrowly ovoid, shorter than the accrescent calyx.

A single specimen, *Blake* 7566, from Izabal is the only Guatemalan specimen seen that appears to be *B. palustris*. This is a dubious one, however, and might almost as well be put into *B. pusilla*.

Buchnera pusilla HBK. Nov. Gen. & Sp. 2: 340. 1818. *B. tinctoria* Bertol. Fl. Guat. 26. 1840 (type from Volcán de Agua, Sacatepéquez, Velásquez). *Cantasola*; *guanimachaj* (fide Aguilar); *flor de cielo*; *tronero del monte* (Izabal, fide Blake).

Moist or dry, often rocky slopes and fields, sometimes in savannas, often in pine or oak forest, often growing on limestone, 2,200 m. or lower; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango. Southern Mexico; British Honduras to Panama; northwestern South America.

Slender annual plants, simple or branched, mostly 50 cm. tall or less, leafy to the inflorescence, scabrous-hispidulous throughout with mostly spreading, short, white hairs; leaves linear or lance-linear, 1-nerved, mostly 1-4 cm. long, spreading or ascending, attenuate to the sessile base, entire or dentate, rarely laciniate-dentate; spikes long and slender, usually many-flowered, the flowers remote, at least in age, the bracts linear-lanceolate or subulate, usually more than half as long as the calyx; calyx tubular in anthesis, tumid in age, 6-7 mm. long, densely scabrous on the nerves, glabrous between them, the teeth triangular-subulate; corolla white or purplish-white, the tube about 8 mm. long, glabrous outside or nearly so; capsule 5-6 mm. long, glabrous, included in the calyx.

The Maya names on Yucatan are reported as "cabalchichibe and xcabal-xaan." The plant has been reported from Guatemala as *B. mexicana* Hemsl. and *B. pilosa* Benth. This species seems to lack the rosettes of broad basal leaves that characterize other species, or else these rosettes disappear at an early stage of growth.

CALCEOLARIA L.

Reference: Fr. Kraenzlin, Scrophulariaceae-Antirrhinoideae-Calceolarieae, Pflanzenreich IV. 257C. 1907.

Annual or perennial herbs (in Central American species) or low shrubs; leaves opposite or rarely verticillate, sometimes mostly basal; flowers mostly yellow and in cymes, small or large; calyx inferior, 4-parted, the lobes valvate, subequal; corolla bilabiate, the tube very short, the limb imbricate in bud, the upper lip usually much smaller than the lower one, cucullate, entire or obscurely bilobate, the lower lip large, ventricose, often much inflated and more or less globose; stamens 2, the anther cells subparallel or contiguous; style short, the stigma scarcely bilobate; ovary usually conic or ovoid, 2-celled; capsule septicidal, the valves cleft from the apex to the middle; seeds numerous, minute, the testa with vertical rows of minute tubercles.

About 200 species, almost all of them in the Andes or lowlands of western South America. One or two other species occur in southern Central America. Some of the South American species have very large and beautiful flowers, and are grown for ornament in hothouses of temperate regions.

Plants tall and coarse, erect or nearly so; leaves more or less triangular, dentate, the petioles greatly dilated and clasping at the base; sepals 1–1.5 cm. long
C. trilobata.

Plants low, weak, often decumbent or procumbent, the petioles not dilated at the base; sepals mostly 4–6 mm. long *C. mexicana*.

Calceolaria mexicana Benth. Pl. Hartweg. 47. 1840. *C. glutinosa* Heer & Regel, Linnaea 24: 196. 1851 (based on material said to have been collected in Guatemala by Warscewicz). *Tronador; monjita; bombilla; hipo; lágrima de piedra; hierba de piedra*.

Mostly in shaded, moist or very wet places, often on wet cliffs, frequently along stream banks, and often a weed in moist or wet, cultivated ground, 1,300–3,800 m.; Alta Verapaz; Baja Verapaz; Chiquimula; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Retalhuleu; Sololá; Totonicapán; Quezaltenango; San Marcos. Southern Mexico; El Salvador to Panama; perhaps South America.

Plants sometimes erect but usually decumbent or procumbent, the stems fleshy and brittle, sparsely branched or sometimes much branched from the base, 10–40 cm. long, villous and usually viscid; leaves petiolate, very variable in form, sometimes ovate and incised-dentate, usually pinnatisect, with ovate or lanceolate, acute lobes, these mostly dentate, green above and sparsely villous, very pale beneath, sparsely or densely villous or often glabrate; flowers sulphur-yellow, solitary in the leaf axils, long-pedicellate, the pedicels viscid-villous; calyx lobes oblong to ovate, acute, about 4 mm. long in anthesis, glandular-pilose and ciliate outside; corolla variable in size but usually about 1 cm. long, sometimes much smaller; capsule ovoid, about 6 mm. long.

The material referred here is highly variable, and possibly more than a single species is represented. Variation seems to be in all

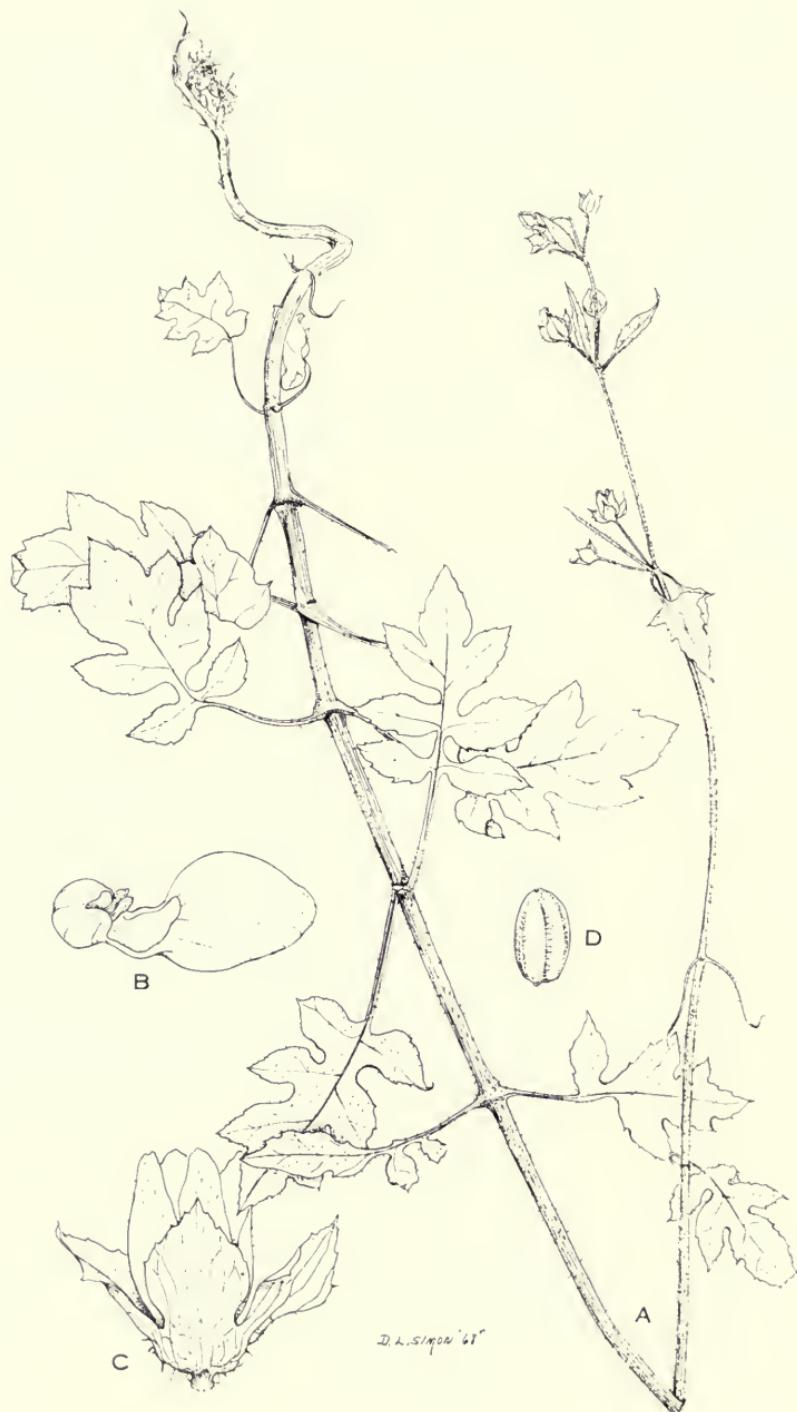


FIG. 68. *Calceolaria mexicana*. A, habit, $\times \frac{1}{2}$; B, corolla, $\times 2$; C, calyx and capsule, $\times 3$; D, seed, $\times 15$.

organs of the plant, and it is not obvious on what characters species could be segregated, unless a large number were recognized, which would scarcely be a satisfactory solution. It is quite possible that the proper name for all the Mexican, Central American, and Panamanian material is *Calceolaria tripartita* Ruiz & Pavón (Fl. Peruv. 1: 14, t. 20. 1798). The plant is a rather weedy one often found in coffee plantations and along wet or moist roadsides. Children often pluck the corollas, hold them against their foreheads and pop them, hence the local name "tronador."

Calceolaria trilobata Hemsl. Biol. Centr. Am. Bot. 2: 439. 1882.
C. scadephora Donn.-Sm. Bot. Gaz. 25: 151. 1898 (type from Costa Rica). *Flor de Santa María*.

Moist dense mixed forest, or in *Abies-Cupressus* forest, often in wet places along the foot of cliffs, 2,100–3,800 m.; Sacatepéquez (type from Volcán de Agua, *Godman & Salvini* 239); Huehuetenango; Quezaltenango; San Marcos. Costa Rica; Panama; perhaps South America.

Plants stout and coarse, erect or suberect, a meter high or less, the stems thick, densely short-villous, the older ones brownish; leaves long-petiolate, the petioles with broad serrate margins, at the base greatly dilated, and the bases of the opposite leaves connate; leaf blades broadly triangular or pentangular, 15 cm. long or less, acute, cordate at the base, the lobes irregularly lobate and coarsely dentate, sparsely villous on both surfaces, green above, pale beneath; peduncles axillary, 1–3-flowered, sometimes 10–18 cm. long, the pedicels 4 cm. long or less; calyx lobes pale green, broadly ovate, 1–1.5 cm. long, acuminate, villosulous; corolla lemon-yellow, 3 cm. long or shorter; capsule broadly ovoid, about 8 mm. long, viscid-villous, subtended by the somewhat accrescent and spreading calyx.

Despite its very large flowers, almost as large as those of any wild *Calceolaria* plants, this is not an especially handsome plant or a very showy one, the flowers being few in comparison with the broad expanse of green leaves. This species occurs in some abundance along the International Highway southeast of Palestina (Quezaltenango). It is local in occurrence in Guatemala.

It is not unlikely that an older name will be found among the Andean species of this large and confused genus when careful studies can be made.

CAPRARIA L.

Annual or perennial herbs or suffrutescent plants, usually erect and branched; leaves alternate, mostly narrow, serrate or dentate; flowers small, axillary, pedicellate; calyx lobes 5, narrow, subequal, almost distinct; corolla campanulate,



FIG. 70. *Capraria biflora*. A, habit of plant with enlargement of leaf to show pubescence, $\times \frac{1}{2}$ and enlarged leaf $\times 1\frac{1}{4}$; B, calyx and pistil, $\times 4$; C, corolla dissected to show stamens and pubescence on inner face of three lobes, $\times 4$; D, mature calyx and capsule, two views, $\times 4$; E, capsule with valve removed to show seeds, $\times 4$; F, seed much enlarged.

white, the 5 lobes plane; stamens usually 5, the anther cells divergent, confluent; style slender, the stigma dilated or bilobate; capsule short, bisulcate, loculicidally dehiscent; seeds small, reticulate.

Species about four, in tropical America. One other occurs in Mexico.

Capraria biflora L. Sp. Pl. 628. 1753. *C. biflora* var. *pilosa* Griseb. Fl. Brit. W. Ind. 427. 1861. *C. biflora* f. *hirta* Loes. Bull. Herb. Boiss. II. 3: 284. 1903 (type from San Juan Ermita, Chiquimula, Seler 3314). *Té de monte*. *Pasmoxia* (Petén).

Moist thickets and swamps, salt flats or in mangrove, abundant in once cleared lands in Petén; Escuintla; Jutiapa; Chiquimula; Santa Rosa; Guatemala; Retalhuleu; Huehuetenango; Zacapa. Florida; Mexico; British Honduras; El Salvador; Nicaragua; Costa Rica; Honduras; Panama; West Indies; and South America.

Plants erect, herbaceous or somewhat suffrutescent, usually much branched, up to 1 m. tall, pilose pubescent throughout (Guatemala) to glabrous. Leaves narrowly lanceolate to oblanceolate, 3-12 cm. long, acute, cuneate to the base and sessile or short petiolate, sharply serrate above the middle; inflorescence of 1 or 2, sometimes several flowers borne on slender pedicels 1-2 cm. long from the axils of leaves; sepals linear-lanceolate to lanceolate, acute or acuminate, 4-6 mm. long, not accrescent, ciliate; corolla white, campanulate, about 1 cm. long, the 5 lobes lanceolate-ovate, three with a tuft of pubescence at the throat, about as long as the tube; capsule oval or ovoid, about as long as the sepals.

This is not a common species in Central America, although it must be locally abundant in Petén. All Guatemalan specimens seen are pilose while to the north in Mexico, in British Honduras and elsewhere in Central America is a plant which seems to be the same as the glabrous form of *C. biflora* from the West Indies and South America. The glabrous and the pilose forms for practical purposes are the same but for those who wish to distinguish the pilose form the name *C. biflora* f. *hirta* Loes. may be used.

CASTILLEJA Linnaeus f.

Reference: Alice Eastwood, Synopsis of the Mexican and Central American species of *Castilleja*, Proc. Amer. Acad. 44: 563-591. 1909.

Annual or usually perennial herbs, pubescent or glabrous; leaves alternate or the lowest opposite, entire or incised, rarely multifid, the floral leaves green or often brightly colored with red, yellow, or white, sometimes reduced to bracts but often wider than the caudine leaves; inflorescences leafy or bracteate, dense or lax terminal spikes or racemes, flowers solitary in the axils of the bracts; calyx tubular, laterally compressed, often dilated at the base, cleft anteriorly or along both margins, the lobes entire or shortly bifid; corolla tube included in the calyx, the limb

bilabiate, the posterior lip galeiform, erect, elongate, narrow, entire; anterior lip very small, trilobate, the lobes concave, spreading, usually less than half as long as the galea; stamens 4, didynamous, inserted on the corolla tube, ascending under the galea; anther cells oblong-linear, the outer one affixed at its middle, the inner one pendulous from the apex; style filiform, entire and stigmatose at the apex; ovules numerous; capsule ovoid or oblong, straight or oblique, loculicidally dehiscent, the valves entire; seed numerous, the testa lax, reticulate.

There have been described more than 200 species of *Castilleja*, all American except one in Siberia. More than 50 species have been described from Mexico. In addition to the species accounted for in this flora, six more have been described from other Central American regions and Panama. Plants of this genus are often abundant in the mountains of the western United States where they are famous for their beauty. Their brilliant colors depend not upon corollas but the bracts subtending them. The genus is dedicated to Domingo Castillejo of the botanical garden in Cádiz.

Plants chiefly annual, the stems usually bearing numerous fleshy nodules near the base; calyx subequally 2-cleft, the segments entire and rounded or broadly obtuse. *C. arvensis*.

Plants perennial, the stems without nodules; calyx deeply cleft anteriorly, posteriorly very shallowly if at all cleft.

Leaves, at least part of them, conspicuously dentate or pinnatisect.

Lower leaves merely dentate; flowers sessile or nearly so. *C. altorum*.

Lower leaves pinnatisect; flowers long-pedicellate. *C. integrifolia* var. *alpigena*.

Leaves entire.

Flowers long-pedicellate. *C. integrifolia*.

Flowers sessile or nearly so, the pedicels 3 mm. long or shorter. *C. tapeinoclada*.

Castilleja altorum Standl. & Steyermark. Field Mus. Bot. 23: 85. 1943.

Alpine meadows or limestone hills in Juniperus forest, 3,000–3,500 m., endemic in the Cuchumatanes, the type from Cerro Chemalito, Steyermark 49908, Huehuetenango.

An erect perennial, the stems simple or sparsely branched, with erect branches, villous with short or long and lax, whitish hairs, sometimes glabrate, densely leafy, the internodes short. Lowest leaves narrowly lance-oblong, 1–2 cm. long, 2.5–5 mm. broad, obtuse, sessile, entire, serrate or laciniate-dentate, the middle caudate leaves entire or often deeply laciniate and broader, the uppermost leaves entire or laciniate, rather densely villosulous or sometimes glabrate; inflorescence spicate, few-many-flowered, 5.5 cm. long or usually shorter, the pedicels 2 mm. long or less; bracts scarlet or sometimes orange, the lower ones laciniate-lobate above, the lateral segments linear, the middle one broadly obtuse or rounded, the upper bracts very obtuse, entire; calyx 16–20 mm. long, puberulent or short-vilosulous; corolla 2–3 cm. long, the galea very narrow, incurved, villosulous dorsally; capsule broadly oblong, 1 cm. long.

Castilleja arvensis Schlecht. & Cham. *Linnaea* 5: 103. 1830. *C. communis* Benth. in DC. *Prodr.* 10: 529. 1846. *C. communis* f. *johnstoniae* Standl. *Field Mus. Bot.* 23: 86. 1943 (type from Santa Lucía Cotz, Escuintla, Standley 63500). *Copete de choje; borajo; chajheecká* (fide Aguilar).

Moist fields or thickets or open forests, often in old fields, sometimes in pine-oak or *Cupressus* forests, 500–3,000 m.; Baja Verapaz; Alta Verapaz; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Retalhuleu; Quezaltenango; San Marcos. Southern Mexico; El Salvador to Panama; western South America.

Plants annual, with short roots; stems pilose and hispid, commonly 25–75 cm. tall, simple or sparsely branched, the base of the stem densely covered with conspicuous tubercles or fleshy scales. Leaves lanceolate or linear-lanceolate, thin and soft, 8 cm. long or less, acute or very obtuse, attenuate to the base, entire; inflorescence spicate, short or elongate, usually many-flowered, often interrupted below; bracts rather narrow, rounded at the apex, bright red above, entire, densely pilose or short-villous; calyx 9–13 mm. long, villous; corolla not exserted from the calyx; capsule broadly ovoid, glabrous, 5–6 mm. long.

Called "hierba de cáncer" in Yucatan; "flor de gato," "coyolito de gato" (El Salvador). This is by far the commonest species in Central America, and the only one that is widely distributed in that area. It is not so handsome a plant as some of the less common mountain species and is often a weed in corn fields. The common and typical form of the species has bracts tipped with scarlet or bright red, but an occasional form has green or pale yellow bracts. In San Marcos there was collected a peculiar color form in which the bracts were burnt orange shading into dark purple at the base.

Castilleja integrifolia L. f. *Suppl. Pl.* 293. 1781. *Banderita; lolisán* (Huehuetenango).

Brushy slopes, open rocky hillsides, often pendent from banks or cliffs, rarely invading cultivated ground, sometimes in forest of *Cupressus* or *Juniperus*, or on white-sand slopes, 1,000–3,400 m.; Alta Verapaz; Baja Verapaz; Zacapa; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Mexico; Honduras; Colombia.

Plants erect or pendent from cliffs or banks, often much branched, the stems very brittle, the whole plant usually rather densely grayish-hispidulous or short-pilose throughout, rarely glabrate; leaves mostly 4 cm. long or less, linear or narrowly linear, entire, scarcely dilated at the base; bracts scarcely broader than the leaves, bright or dark red, entire; racemes often one-sided, rather lax and often

few-flowered, the pedicels 5 mm. long or usually more, erect; calyx about 2 cm. long, puberulent or short-pilose; corolla about 3 cm. long, the galea narrow, more or less curved; capsule oblong-ovoid, about 1 cm. long, glabrous.

Specimens of this species often have been determined as *C. tenuiflora* Benth., a superficially similar species of Mexico, which the junior author believes not to occur in Guatemala.

Castilleja integrifolia var. *alpigena* L. Wms. Field Mus. Bot. 34: 119. 1972.

Moist or rather dry brushy or rocky slopes or on slopes occupied by bunch grasses in the pine and juniper forests, 3,400–4,000 m., or perhaps more. Endemic, the type from near Chemal, *Williams, Molina & Williams* 22186; San Marcos; Quezaltenango; Huehuetenango; Sacatepéquez; Chimaltenango. Mexico. *Chilito de monte; flor colorado.*

Plants stiff and erect, brittle, perennial from a thick woody root, mostly 60 cm. high or less, puberulent or short-pilose throughout, the stems simple or branched; leaves all, or at least the upper ones, pinnatisect, the segments few, linear, spreading, the lower leaves often or mostly entire and linear or lance-linear, mostly 2 cm. long or shorter; flowers on short or elongate pedicels, the racemes few-many-flowered, dense or lax, short or elongate; bracts pinnatisect, bright red with yellow margins; calyx 2 cm. long, puberulent, red and yellow; corolla 3–4 cm. long, the galea narrow, curved or almost straight; capsule 1 cm. long.

This variety has been reported from Guatemala as both *C. fissifolia* L. f. and *C. pectinata* Mart. & Gal.

Castilleja tapeinoclada Loes. Bull. Herb. Boiss. II. 3: 285. 1903.
C. tapeinoclada var. *subglabra* Loes. l.c. (type, *Seler* 2357, above Totonicapán). *C. tapeinoclada* var. *hirta* Loes. l.c. (type, *Seler* 2933, Zihá, dept. Quezaltenango). *C. katakyptusa* Loes. l.c. 286 (type, *Seler* 2750, between Todos Santos and Chiantla, Huehuetenango).

Subalpine meadows, 2,700–4,000 m.; endemic; San Marcos; Huehuetenango; Totonicapán; Sololá.

Plants perennial, low and spreading, the stems often several from each root, commonly 10 cm. long or less, hirtellous or glabrate; leaves mostly 15 mm. long or less, mostly 1–3 mm. broad, linear or lance-linear to linear-oblong, long-attenuate, not dilated at the base, 1-nerved or obscurely 3-nerved, glabrous or pubescent; bracts longer than the leaves, usually green, sometimes tipped with red, entire or the uppermost with 1–2 short linear lobes; pedicels 3 mm. long or less; calyx 2–2.5 cm. long, pale green and red; corolla yellow and red, 3.5–4 cm. long, the galea somewhat curved.

An occasional and often very small plant of the highest mountain meadows. The flower is often the largest part of the plant appearing



FIG. 71. *Castilleja tapeinoclada*. A, plant, natural size; B, flower dissected, $\times 1\frac{1}{2}$.

above ground and the whole plant is often reduced to a single flower with subtending bracts. It occurs in the meadows which are badly overgrazed by sheep, often on almost bare gravel so that the colorful bracts make the plant quite visible.

CYMBALARIA Hill

Repent or often much branched perennial herbs most often found in cracks in moist walls. Leaves palmately veined and lobed or deeply toothed, opposite; inflorescences axillary, a single flower or a few-flowered cyme; flowers small and usually purple; corolla tube with a short anterior spur at the base, bilabiate, the anterior lip trilobate and with a palate closing the throat; stamens 4; capsule opening by 2 pores, the 2 locules each splitting into 3.

An Old World genus, of perhaps ten species, often included in *Linaria*. One species is found spontaneous in Central America but is not common.

Cymbalaria muralis Gaertn., Mey. & Schreb. Fl. Welt. 2: 397. 1800. *Antirrhinum cymbalaria* L. Sp. Pl. 612. 1753. *Linaria cymbalaria* Miller, Gard. Dict. ed. 8. No. 17. 1768. *Alfombrilla*.

Native of Europe, naturalized on stone or adobe walls; Guatemala; Sacatepéquez; Quiché; Quezaltenango; San Marcos. Honduras; Costa Rica.

Plants perennial, glabrous, the stems very slender, creeping, often rooting at the nodes, or sometimes pendent from walls; leaves on long slender petioles, orbicular-reniform, 1-2.5 cm. broad, shallowly 3-5-lobate, palmately 3-5-nerved, the lobes broad, obtuse; flowers axillary, solitary, blue or lilac, 8-10 mm. long, the pedicels slender, recurved, shorter than the petioles; calyx lobes lanceolate, acute; capsule small, globose, several-seeded; seeds rugose, not winged.

When cultivated in the United States, this usually is known as "Kenilworth ivy."

DIGITALIS Linnaeus, Foxglove

Coarse, biennial or perennial herbs, the stems simple or branched from the base; leaves alternate, entire or dentate; flowers large and showy, purple, white, or yellowish, in long, terminal, usually 1-sided racemes; calyx 5-parted, the segments imbricate; corolla declined, slightly irregular, the tube contracted above the ovary, then rather abruptly dilated, longer than the 4-5-lobate slightly bilabiate limb, the upper lip broadly emarginate or 2-cleft, the lower lip trilobate, the middle lobe largest, the lateral lobes exterior in bud; stamens 4, didynamous, ascending, usually included; style slender, the stigma bilobate; capsule ovoid, septicidally dehiscent; seeds numerous, rugose.

Species about 20, in Europe and Asia.

Digitalis purpurea L. Sp. Pl. 621. 1753. *Dedalera; dedal de la reina; digital.*

Native of Europe; grown in many regions for ornament or for medicinal use; naturalized in some regions of North America, and escaped in the mountain meadows of Costa Rica; grown occasionally in the highlands of Guatemala, especially in Quezaltenango and San Marcos, not known to be naturalized.

Plants usually biennial, softly pubescent almost throughout, the stems stout, erect, 50–150 cm. high; basal and lower caudine leaves ovate or ovate-lanceolate, 15–25 cm. long, acute or acuminate, narrowed at the base, dentate or subentire, the upper leaves smaller, narrower, and sessile; racemes 30 cm. long or more, dense, 1-sided, many-flowered, the flowers mostly purple or white, 3.5–5 cm. long, declined.

Foxglove is not a common garden plant anywhere in Guatemala, but it is seen here and there in the highlands where the climate is cool or cold. *Digitalis* is an important drug plant, extensively cultivated in some parts of Europe, and more recently in North America, for its leaves, from which the drug digitalis is obtained. This is a powerful heart stimulant, and in more than prescribed doses toxic.

EREMOGETON Standley & Williams

Suffrutescent herbs to small trees, softly pubescent to somewhat tomentose. Leaves alternate to subopposite, entire or remotely dentate; inflorescence axillary, the flowers solitary on long pedicels, ebracteolate, large and showy, white to yellow; calyx deeply 5-lobate, the lobes valvate; corolla tube broad, tubular-campanulate, the limb bilabiate, the anterior lip tripartite, concave, the lobes spreading, subequal, the posterior lip erect, bipartite, flat; stamens 2, inserted on the base of the corolla, exserted, the anthers cells oblong-linear, divergent, confluent at the apex, staminodia none; ovary 2-celled, the style elongate, the stigma capitate, somewhat bilobate; ovules numerous; capsule ovoid, acuminate, bisulcate, indurate, 4-valvate at the apex; seeds numerous, narrowly oblong, sometimes angulate, the embryo straight.

This has been called *Ghiesbreghtia* Gray, a homonym of *Ghiesbreghtia* A. Rich. & Gal. A single species, with rather limited range, is known.

Eremogeton grandiflorus (Gray) Standl. & L. Wms. *Ceiba* 3: 172. 1953. *Ghiesbreghtia grandiflorus* Gray, Proc. Am. Acad. 8: 630. 1873. *Campanula; jicarillo* (fide Aguilar).

Dry brushy and rocky hillsides, 800–1,600 m.; Zacapa; Chiquimula; Quiché; Huehuetenango. Mexico (Chiapas).

A suffrutescent herb to a small tree as much as 6 m. tall, the young branches densely pale tomentose. Leaves subopposite to alternate, elliptic to ovate or narrowly obovate, obtuse, coarsely crenate to serrulate or even entire, acute to the



FIG. 72. *Ereomogeton grandiflorus*. A, habit, a branch, $\times \frac{1}{2}$; B, mature calyx and capsule, $\times 1\frac{1}{2}$.

base, densely and softly pubescent especially beneath, 3–12 cm. long and 2–6 cm. broad, shortly petiolate, the petiole marginate; inflorescence axillary, usually consisting of a single long pedicellate flower from the leaf axil, the pedicels as much as 6 cm. long; calyx divided to near the base, the lobes linear or elliptic-oblong, unequal, acute, puberulent, up to 3 cm. long and 0.6 cm. broad; corolla large, white or yellowish, glabrous to sparsely pilose outside, 6–8 cm. long; capsule glabrous, 2–3 cm. long.

Although the plant is an uncommon one, it is to be found in some abundance along the dry south facing slopes of the Cuchumatanes Mountains where it forms dense thickets on exposed rocky slopes or even in protected ravines.

ESCOBEDIA Ruiz & Pavón

References: Francis W. Pennell, Escobedia, a neotropical genus of Scrophulariaceae, Proc. Acad. Nat. Sci. Phila. 83: 411–426, illus. 1931. John W. Thieret, (Escobedia in) The Scrophulariaceae-Buchnereae of Central America, Ceiba 8: 92–101. 1961.

Tall perennial herbs, glabrous or pubescent, the roots yellow, the stems simple or branched, striate or angulate; leaves caudate, opposite, sessile, thick, reticulate-veined; flowers very large, racemose, in the axils of foliaceous bracts, the peduncles bibracteolate or naked; calyx funnelform or tubular, the lobes usually much shorter than the tube, conspicuously nerved; corolla white, salverform, the tube long and slender, glandular-puberulent or rarely glabrous outside, the lobes pilose within; stamens 4, equal, the anthers narrow, glabrous, the cells equal, aristate at the base; style elongate, with 2 stigmatic lines at the apex; capsule ellipsoid, indurate, glabrous; seeds numerous, clavate.

There are about 15 species of *Escobedia*, all in tropical America from Mexico to Bolivia and Brazil. Most occur in the mountains but some are found in the lowlands in Guatemala and British Honduras. There are five additional species in our area, three in Mexico and two in southern Central America. Some species are quite showy but the genus is rarely seen in Guatemala.

Calyx lobes linear to lanceolate or ovate-lanceolate, longer than broad . . . *E. laevis*.
Calyx lobes triangular-ovate or broader, broader than long.

Leaves linear-lanceolate to narrowly lanceolate; bracteoles near middle of peduncle; stems glabrous or nearly so *E. guatemalensis*.
Leaves oblong or elliptic-oval; bracteoles inserted at the base of the calyx; stems rough pubescent *E. longiflora*.

***Escobedia guatemalensis* Loesner, Vehr. Bot. Ver. Brandenb. 53: 83. 1912. *Campana; campana blanca; azucena silvestre*.**

Rocky slopes and pine or oak woods, 800–1,500 m. Huehuetenango (type, Seler & Seler 2663, GH); Guatemala; Jalapa. Southern Mexico.

Erect terrestrial herbs to 6 dm. tall or perhaps more, the stems terete, glabrous and smooth. Leaves linear-lanceolate to narrowly lanceolate, acute, sessile, entire or obscurely denticulate, trinerved and reticulate between the main veins, glabrous or the margins slightly scabrid, to 10 cm. long and 1 cm. broad; inflorescence of 2-8 flowers in the axils of upper leaves; peduncles mostly about 2 cm. long, bibracteolate at the middle or above or naked; calyx tubular, slightly explanate toward the apex, glabrous, 5-6 cm. long and 7-8 mm. in diameter (when flattened 11-13 mm. across), 10-nerved and reticulate between the nerves, lobes 5, acute, broader than long, broadly triangular, sometimes dentate, about 2-5 mm. long; corolla salver-form, 5-lobate, the tube 10-12 cm. long, narrowed toward the base, lobes explanate, ovate-orbicular, the apex rounded, about 2-3 cm. long and 2-2.5 cm. broad; anthers 4, inserted below the orifice of the tube; capsule 2-3 cm. long, obovate.

Escobedia laevis Schlecht. & Cham. Linnaea 5: 108. 1830. *E. linearis* Schlecht. Linnaea 8: 246. 1833.

Open marshes or bogs at 1,500-1,800 m. but at 500 m. or less in Petén, Huehuetenango, and British Honduras. Petén; Quiché; Chimaltenango. Mexico; British Honduras; Honduras.

Plants a meter high or less, glabrous throughout, the stems simple, bearing only a few flowers; leaves linear, attenuate, 10-20 cm. long or sometimes shorter, 1 cm. broad or less, denticulate or entire, sometimes scaberulous above but glabrous beneath; peduncles 4-7 cm. long; bractlets 6-18 mm. long, linear, inserted near the middle of the peduncle, or often absent; calyx tube 4-5.5 cm. long, the teeth lance-linear, 10-18 mm. long; corolla tube 9-12 cm. long, glandular-puberulent outside, the limb 6-8 cm. broad; capsule 2.5 cm. long.

Sometimes called "azafrán" in Mexico. The yellow roots give a yellow dye. They sometimes are utilized for coloring food, like the more common achiote (*Bixa*).

Escobedia longiflora Pennell, Proc. Acad. Nat. Sci. Phila. 83: 423. 1931. *Campanula*.

Open or brushy, often rocky slopes, sometimes in pine forest, 1,300-2,500 m.; Jalapa; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; San Marcos. Mexico.

Plants stout, a meter high or less, simple or branched, the stems scabrous-puberulent; leaves sessile, mostly oblong or elliptic-oval, 4-11 cm. long, acute or obtuse, serrate or subentire, scaberulous above, scabrous beneath, acute or obtuse, serrate or subentire, scaberulous above, scabrous beneath on the veins; peduncles 2-6 cm. long, the bractlets 5-15 mm. long, inserted below the calyx; calyx tube 4-6 cm. long, the teeth broadly triangular, 3-6 mm. long, acute or acuminate; corolla tube 10-13 cm. long, the limb 6-7 cm. broad; capsule about 3 cm. long; seeds linear, 4 mm. long.

This has been reported from Guatemala as *E. scabrifolia* Ruiz & Pavón.



FIG. 73. *Escobedia laevis*. Habit of a plant in flower, $\times \frac{1}{2}$.

GERARDIA Linnaeus

Reference: Francis W. Pennell, *Agalinis* and allies in North America, Proc. Acad. Sci. Phila. 80: 339-349. 1928; 81: 111-249. 1929.

Herbs, annual or perennial, usually erect, glabrous or scabrous; leaves, at least the lower ones, opposite, entire or incised, the uppermost often reduced to bracts; flowers usually showy, purple or white in Central American species, pedicellate or subsessile; calyx campanulate, 5-dentate or 5-lobate, the lobes entire or denticulate, open in bud or slightly imbricate; corolla tube broad, short or elongate, dilated above into a broad throat, the limb spreading, the 5 lobes rounded, the 2 posterior ones often somewhat smaller; stamens 4, didynamous, shorter than the corolla, the filaments pilose; anthers glabrous or villous, the cells parallel, equal, muticous at the base or short-aristate; style clavate and stigmatose at the apex; ovules numerous; capsule obtuse or short-acute, loculicidally dehiscent, the valves entire or bifid; seeds numerous, oblong, cuneate, or angulate, the testa lax.

Species 50 or more, all American, and chiefly in the United States. No others are known in Central America.

Flowers almost sessile, the peduncles much shorter than the calyx . . . *G. spiciflora*.
Flowers long-pedunculate, the peduncles several times as long as the calyx.

Stems glabrous; corolla 2.5-2.7 cm. long; peduncles not bracteolate. *G. peduncularis*.

Stems short-pilose; corolla about 1.5 cm. long; peduncles bibracteolate. *G. hispida*.

Gerardia hispida Mart. Nov. Gen. & Sp. 3: 13. 1829. *Anisantherina hispida* Pennell, Mem. Torrey Club 16: 106. 1920.

Moist savannas or pine forest, little above sea level; Petén. Mexico; British Honduras; Honduras; Nicaragua; Panama; Cuba; Brazil.

Plants annual, 50 cm. high or less, simple or branched, blackening when dried (like most other species), the slender stems pilose with short spreading hairs; leaves spreading or ascending, linear, 1.5-2 mm. broad, scaberulous; racemes 10-14-flowered, the slender pedicels 1.5-2.5 cm. long or in fruit often much longer; bractlets inserted near the middle of the peduncle, linear; calyx tube 4.5-5.5 mm. long, broadly campanulate, the teeth 2-2.5 mm. long, ovate, acute; corolla 12-15 mm. long, pink; capsule 7-9 mm. long; seeds dark brown, the testa reticulate.

This has been reported incorrectly from British Honduras as *G. maritima* var. *grandiflora* Benth.

Gerardia peduncularis Benth. in Hook. Comp. Bot. Mag. 1: 209. 1836. *G. peduncularis* var. *guatimalensis* Benth. in DC. Prodr. 10: 518. 1846 (type from Volcán de Agua, near Santa María de Jesús, Hartweg 607). *Agalinis peduncularis* Pennell, Rhodora 20: 135. 1918.



FIG. 74. *Gerardia hispida*. A, habit of plant, $\times \frac{1}{2}$; B, dissected corolla to show lobing and stamens, $\times 3$; C, calyx and style, $\times 3$.

Open pine-oak forest, 1,900–2,400 m.; Quiché; Sacatepéquez; Huehuetenango. Mexico; Honduras; Nicaragua.

Plants annual or perhaps sometimes perennial, 70 cm. high or less, simple or often much branched, the stems usually glabrous; leaves linear, 4 cm. long or shorter, 1.5 mm. broad or narrower, somewhat scabrous on the upper surface, entire; racemes elongate, 6–12-flowered, the peduncles glabrous, in flower 2–5 cm. long; calyx tube 4–6 mm. long, broadly campanulate, the teeth 1–2.5 mm. long, triangular-lanceolate or filiform; corolla purple-rose, 2–3 cm. long, pubescent or glabrous outside, the lobes ciliate; capsule 6–8 mm. long, globose ovoid; seeds 1 mm. long or less, broadly quadrangular, dark brown or almost black, reticulate.

This is presumably the plant reported by Loesener from Huehuetenango as *G. purpurea* L., on the basis of a collection made by Seler.

Gerardia spiciflora Engelm. Bost. Jour. Nat. Hist. 5: 227. 1845.
Gerardia maritima var. *grandiflora* Benth. in Hook. Comp. Bot. Mag. 1: 208. 1836. *Gerardia cereifera* Millspaugh, Field Mus. Bot. 2: 98. 1900.

Savannas and pine barrens near sea level; southern United States; West Indies; Mexico; British Honduras.

Small slender annual plants, simple or somewhat branched near the top, 4–8 dm. tall. Leaves narrowly linear, acute, scabrous above, 1–2.5 cm. long and scarcely 1 mm. broad; inflorescence of a single flower in the axils of the upper leaves, pedicels to 2 mm. long; calyx campanulate, about 3 mm. long, lobate to near the middle, the lobes lanceolate-triangular, acute, scabrous-ciliate; corolla pubescent externally, 15–18 mm. long, the tube 10–12 mm. long, the lobes rounded to truncate, ciliate, 5–6 mm. long; stamens 4 of two unequal pairs; style 4–7 mm. long; capsule globose, 4–5 mm. long.

This name may well include *Gerardia harperi* Pennell and *G. albida* (Britt. & Pennell) Pennell both of which have been credited to British Honduras.

GIBSONIOTHAMNUS L. Williams

Small divaricately branched epiphytic or terrestrial shrubs. Leaves opposite, petiolate, coriaceous, the leaves of a pair prominently anisophyllous; inflorescence few-flowered, short, axillary cymes or fascicles, the peduncle very short or almost none, the pedicels elongated; calyx campanulate, 5-lobate, the lobes often long and narrow, laterally compressed; corolla regular and symmetrical or only slightly zygomorphic, tubular, the limb 5-lobate, the lobes nearly equal and short; stamens 4, equal or didynamous, included, free, inserted toward the base of the tube, staminode present; style slender, exceeding the stamens; stigma capitate; capsule baccate, possibly indehiscent; ovary bilocular with numerous ovules in each locule; seeds many, angular, immersed in the pulp.

A small genus of four known species closely allied to *Schlegelia*. The genus, named for Dorothy Nash Gibson, collaborator in the

"Flora of Guatemala," is known only in southern Mexico and Central America.

Calyx lobes short, 1-2 mm. long.....*G. cornutus*.

Calyx lobes as long as the tube, the lobes 4-6 mm. long and linear to lanceolate.

Calyx lobes linear-lanceolate, about 5 mm. long.....*G. mimicus*.

Calyx lobes linear-subulate, 5-6 mm. long.....*G. moldenkeanus*.

Gibsoniothamnus cornutus (Donn.-Sm.) A. Gentry, Fieldiana, Bot. 34: 55. 1971. *Schlegelia cornuta* Donn.-Sm. Bot. Gaz. 18: 6. 1893 (type from Quiché, *Heyde & Lux* 3044). *Clerodendron pitheco-bium* Standl. & Steyermark. Field Mus. Bot. 22: 373. 1940 (type from Quezaltenango, *Standley* 67887). *Gibsoniothamnus pitheco-bius* L. Wms. Fieldiana, Bot. 32: 214. 1970.

Epiphytic in cool broad-leaf forests, 2,000-2,600 m.; Quiché; Quezaltenango; Suchitepéquez; Zacapa. Endemic.

Epiphytic shrubs 1-2.5 m. tall, branches thick, the internodes 2.5-4 cm. long, strigose but becoming glabrous with age. Leaves subcoriaceous, oblong-elliptic or elliptic-obovate, acute to obtuse, or short acuminate, 6-13 cm. long and 4-8 cm. broad, glabrous, minutely punctate, petiole short and thick, 10-12 mm. long; inflorescence 1-several-flowered fascicles in axils of leaves, shorter than the leaves; calyx campanulate, sparsely pubescent, becoming glabrous, 4-6 mm. long, 5-lobate, the lobes laterally compressed, 1-2 mm. long; corolla tubular, 3-4 cm. long, the limb 5-lobate, the lobes subequal, 2-4 mm. long, oblong or oblong-ovate; stamens 4, subequal in length, attached toward the base of the tube; staminodium 1, dorsal; ovary bilocular, each cell with numerous ovules.

This is the best known of the member of this genus. It is to be expected in Mexico.

Gibsoniothamnus mimicus (Standl. & Steyermark.) L. Wms. Fieldiana, Bot. 32: 214. 1970. *Clerodendron mimicus* Standl. & Steyermark. Field Mus. Bot. 23: 227. 1947 (type from Huehuetenango, *Steyermark* 48631).

Epiphyte in the wet forest, about 2,000 m.; Huehuetenango; Zacapa. Endemic.

Epiphytic shrubs with sparsely-villous branches. Leaves coriaceous, vernicose, villous-pilose or glabrous, the blade obovate to elliptic or even subrhombic-ovate, obtuse or acute, 5-12 cm. long and 3-7 cm. broad, petiole thick, up to 1 cm. long; inflorescence a short axillary raceme of one or few flowers; pedicels slender, up to 2 cm. long; calyx campanulate, the tube about 5 mm. long, the lobes 5, linear-lanceolate, about as long as the tube; corolla about 25 mm. long (or longer?), the tube slender and about 22 mm. long, the limb 5-lobate, the lobes ovate to suborbicular, ciliate, about 3.5 mm. long.



FIG. 75. *Gibsoniothamnus cornutus*. Flowering branch, $\times 1$; corolla dissected to show stamens, $\times 2$; calyx, $\times 2$; enlarged anther from front and back, $\times 5$.

This species is very near to *G. moldenkeanus* and may be found to be the same.

***Gibsoniothamnus moldenkeanus* (Standl.) L. Wms.** Fieldiana, Bot. 32: 214. 1970. *Clerodendron moldenkeanus* Standl. Field Mus. Bot. 22: 99. 1940.

Shrubs, probably epiphytic, in wet forest, about 1,400 m. Mexico, to be expected in Guatemala, and possibly should include *G. mimicus*.

Shrubs, much branched, the branches glabrous or pilose at the nodes. Leaves (immature) ovate or ovate-lanceolate, broadly acuminate, puncticulate on both surfaces, somewhat pilose, glabrescent, 4–6 cm. long and 1.5–2.5 cm. broad; inflorescence few-flowered sessile axillary cymules; pedicels slender, glabrous, 1.5–2 cm. long; calyx campanulate, tube about 4 mm. long, the lobes linear-subulate, 5–6 mm. long, unequal, glabrous; corolla 12 mm. in bud, tube long, the limb short.

Known only from the type (*Matuda 2760*) collected on Tacaná Volcano, the type immature.

GRATIOLA L.

Low herbs, annual or perennial, erect or diffuse, glabrous or viscid-pubescent, often somewhat succulent; leaves opposite, entire or with usually inconspicuous teeth; flowers small, solitary in the leaf axils, pedicellate, yellow or white, the pedicels usually bibracteolate at the apex; calyx 5-parted, the segments narrow, subequal; corolla tube cylindric, the lips spreading, the posterior one outermost in bud, entire or shallowly bilobate, the anterior lip trilobate, with rounded lobes; posterior 2 stamens perfect, included, the filaments filiform, the anther cells distinct, parallel; anterior staminodia included in the corolla tube, filiform, or none; style filiform, dilated or bilamellate at the apex; ovules numerous in each cell; capsule ovoid or globose, often acute, loculicidally and septicidally dehiscent, 4-valvate; seeds numerous, small, striate and transversely reticulate.

Some 20 or more species widely distributed but mostly in temperate regions. Those of Guatemala are far removed from the nearest known localities in Mexico for this genus. The genus is much in need of revision.

Small herbs to about 6 cm. tall; corolla 8–10 mm. long; capsule globose, about 3.5 mm. long *G. oresbia*.
 Taller herbs to about 20 cm.; corolla 5–6 mm. long; capsule ovoid-attenuate, 5–6 mm. long *G. sp.*

***Gratiola oresbia* Robinson, Proc. Am. Acad. 44: 614. 1909.**

Subalpine meadows, in bogs and along streams, 3,200–3,500 m.; Huehuetenango; Totonicapán. Mexico.

Small perennial herbs up to about 6 cm. tall. Leaves linear-oblanceolate, obtuse, obscurely punctate or epunctate; inflorescence a single pedicellate flower in the axils of leaves, flower yellow, pedicels to 1.5 cm. long; calyx lobes similar, linear-lanceolate, acute, glabrous, about 3.5 mm. long; corolla 8–10 mm. long, bilabiate, yellow; capsule globose, about 3.5 mm. in diameter.

The description is based on the Guatemalan specimens seen. The genus, as many in this family, is in need of revision.

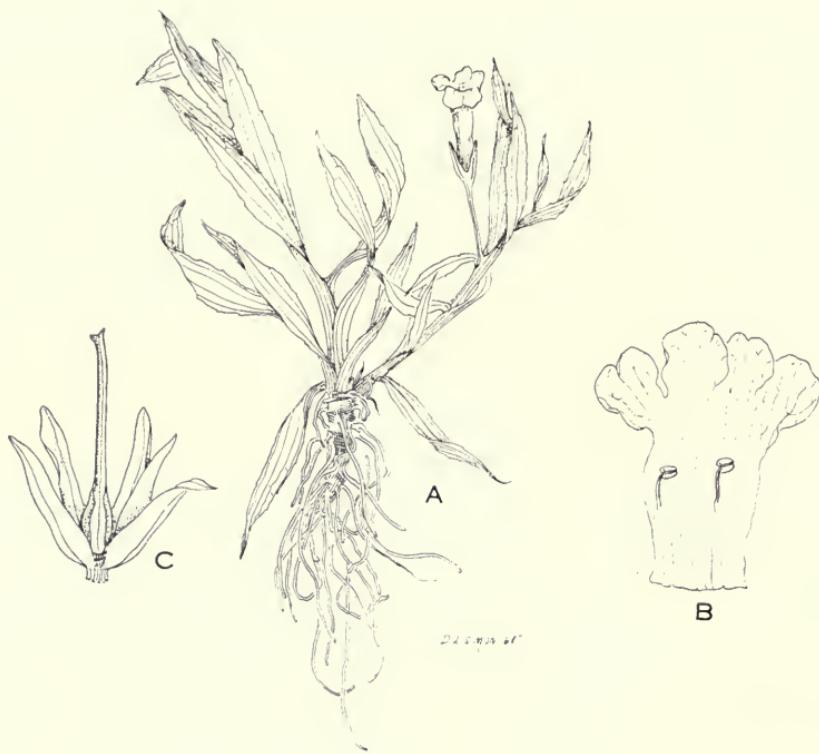


FIG. 76. *Gratiola oresbia*. A, habit, $\times 1$; B, corolla dissected, $\times 2$; C, calyx and style, partially dissected, $\times 4$.

Gratiola sp.

In pools, alpine meadow, Cerro Chemalito, Sierra de los Cuchumatanes, Dept. Huehuetenango, Steyermark 49911.

Slender perennial plants to about 20 cm. tall, the stems erect. Leaves narrowly lanceolate or oblanceolate, acute or somewhat obtuse, glabrous, obscurely glandular-punctate, to 2 cm. long and 0.5 cm. broad; inflorescence single axillary flowers, the pedicels to about 5 mm. long and ebracteate; calyx to about 3 mm. long, divided to the base, the lobes narrowly oblong-lanceolate, obtuse, punctate; corolla bilabiate, yellow, about 5-6 mm. long; capsule ovoid and attenuated to the apex, about 5-6 mm. long.

The plant cited above may be another growth form of that which we have called *G. oresbia* but it seems not to be.

HEBE SALICIFOLIA (Forst.) Pennell, Rhodora 23:38.1921. *Veronica salicifolia* Forst. Fl. Ins. Austr. Prodr. 3. 1786. *Veronica*; *Geronomo*.

A native of New Zealand occasionally cultivated in Guatemala and an attractive shrub. Often referred to the genus *Veronica*.



FIG. 77. *Hemichaena fruticosa*. A, branch from plant, $\times \frac{1}{2}$; B, corolla dissected, $\times 1\frac{1}{2}$; C, calyx and style, $\times 1\frac{1}{2}$.

HEMICHAENA Bentham

Reference: Thieret, John W. *Synopsis of Hemichaena, including Berendtiella*, Fieldiana, Bot. 34:89-99, illus. 1972.

Coarse tall herbs or shrubs, glabrous to viscid-villous. Leaves opposite, dentate, often rugose; inflorescence axillary, 1- to cymosely many-flowered, the flowers large and showy, yellow to orange or red, bracteate; calyx campanulate or tubular-campanulate, 5-costate, 5-lobate; corolla ampliate, bilabiate, the tube exceeding the calyx, the posterior lip bilobate, erect or spreading, the anterior lip spreading, trilobate, the lobes rounded, plane; stamens 4, didynamous, inserted at or below middle of corolla tube, exserted or not; anther cells parallel but finally divergent; stamenodia none; style dilated at the apex into 2 lamellae; capsule ovoid or oblong, loculicidally dehiscent; seeds very numerous, minute, linear-oblong to fusiform, the testa reticulate or reticulate-striate.

The genus *Berendtiella* Wettstein and Harms is treated as a synonym, following Dr. Theiret.

Corolla orange to red; calyx less than 15 mm. long *H. rugosa*.
Corolla yellow; calyx more than 15 mm. long *H. fruticosa*.

Hemichaena fruticosa Benth. Pl. Hartweg. 78. 1841. *Leucocarpus fruticosus* Benth. in DC. Prodr. 10: 336. 1846. *Amarillo*.

Chiefly in wet thickets or on wet banks or cliffs, sometimes in exposed, rather dry, often rocky places, 1,700-3,450 m.; Guatemala (Volcán de Pacaya); Sololá; Huehuetanango; Quezaltenango (type from Quezaltenango, Hartweg 548). Mexico (Oaxaca and Chiapas); Costa Rica.

Plants usually herbaceous and a meter high or less, simple or branched, sometimes a branched shrub of 2.5 m., rather densely viscid-villous almost throughout; leaves ovate-oblong or lance-oblong, 16 cm. long or shorter, acute to attenuate, dilated at the base and united around the stem, serrate or dentate, somewhat paler beneath; calyx densely short-villous, 2 cm. long, green, the lobes ovate, acute or acuminate, almost equaling the tube; corolla yellow, 4-5 cm. long, the tube 1-1.5 cm. broad, the lobes almost 1.5 cm. long, thinly villosulous outside; capsule almost 1.5 cm. long.

A rather showy plant, suggestive of some of the shrubby large-flowered *Mimulus* species of the Pacific coast of the United States. It is one of the plants found on the lava fields near the summit of Volcán de Pacaya (Guatemala). It is particularly plentiful in the barrancos of Quezaltenango and San Marcos.

Hemichaena rugosa (Benth.) Thieret, Fieldiana, Bot. 34: 96. 1972. *Diplacus rugosus* Benth. in DC. Prodr. 10: 368. 1846. *Berendtia ghiesbrechtii* A. Gray, Proc. Am. Acad. Sci. 7: 380. 1868. *B. rugosa* A. Gray, l.c. *Berendtiella rugosa* Thieret, Ceiba 4: 305. 1955.

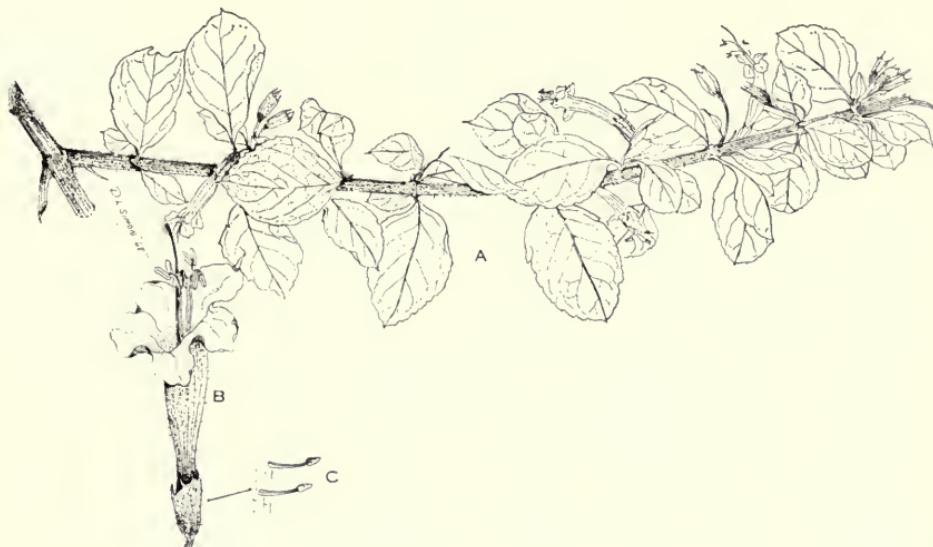


FIG. 78. *Hemichaena rugosa*. A, branch, $\times 1$; B, flower in natural position, $\times 1$; C, glandular hairs from calyx, much enlarged.

Fairly common on the dry, brushy and rocky hillsides in the vicinity of Huehuetenango, rare elsewhere, alt. 1,600 to about 3,000 m.; Zacapa; El Quiché; Huehuetenango. Mexico (Chiapas); Honduras.

A densely branched shrub 1–3.5 m. high, the branches brownish or reddish, densely viscid-villousulous; leaves almost sessile, ovate to ovate-oblong, 1.5–4.5 cm. long, acute or obtuse, obtuse or cuneate at the base, coarsely crenate or serrate, very rugose, green above and viscid-pubescent, paler beneath, densely glandular-villousulous, the veins prominent and reticulate; calyx green, 6–10 mm. long, glandular-pubescent, the teeth spinose-subulate, short; corolla red or orange-red, 2.5–3.5 cm. long; style and stamens long-exserted.

A common and conspicuous shrub along the southern face of the Sierra de los Cuchumatanes, often forming extensive thickets on the barest rocky slopes, especially on serpentine. It is able to withstand the intense sunshine and heat of these exposed slopes, and blooms through the dry season. The flowers are borne in abundance, and are rather pretty, somewhat suggestive of those of *Mimulus*.

The range of this species, from Chiapas and adjacent Guatemala, to the Department of Zacapa where it is known by a single collection, then to a single small area in the mountains of Central Honduras, is of interest. The species is an attractive one and certainly would have been collected more often were it common or even occasional through the range indicated.

LAMOUROUXIA HBK.

References: B. L. Robinson & J. M. Greenman, A synoptic revision of the Genus Lamourouxia, Am. Journ. Sci. 50: 169-174. 1895, reproduced in Contr. Gray Herb. No. 9.

Perennial herbs, subshrubs or perhaps shrubs with brittle stems, erect or scandent, glabrous or pubescent, the pubescence sometimes viscid; leaves opposite, entire, dentate or dissected; inflorescence of flowers in the axils of upper leaves or bracts, appearing racemose, paniculate or corymb-like; flowers red or orange, large and showy; calyx campanulate, 4-lobate, the segments subequal, of two subequal pairs or the calyx (one Mexican species) cleft nearly to the base abaxially and with 4 small terminal lobes; the corolla bilabiate, the tube (or throat) more or less ventricose, the posterior lip erect and often galeate, entire or emarginate and bilobate, the anterior lip usually shorter, narrow, trilobate at the apex and biplicate within below the apex; stamens 4, didynamous, all fertile or more usually 2 fertile stamens and 2 staminodes that are sterile, included in the galea; fertile anthers contiguous or in coherent pairs, lanate, sterile anthers much reduced; style usually exserted in anthesis and the apex geniculate; stigma terminal; capsule ovoid, loculicidal, the valves entire; seeds many, minutely roughened, reticulate, or reticulate-bullate.

An attractive and distinctive genus of some 30 or more species in the mountains of the neotropics. One or two other species are to be found in southern Central America and Panama—many more in Mexico which is the northern center of development of the genus. Even though the genus is distinctive the species are often difficult to distinguish. This treatment for "Flora of Guatemala" does not necessarily follow the annotations of Dr. W. R. Ernst, who has a monograph of the genus in progress.

- Leaves bipinnatifid *L. multifida*.
- Leaves simple, entire or dentate.
 - Leaves sessile, cordate and clasping at the base *L. viscosa*.
 - Leaves petiolate except sometimes the uppermost, never cordate and clasping.
 - Fertile stamens 2; leaves linear to lanceolate.
 - Calyx lobes linear-lanceolate to lanceolate.
 - Leaves entire, calyx lobes linear-lanceolate *L. longiflora*.
 - Leaves serrulate or crenate; calyx lobes lanceolate
 - L. longiflora* var. *lanceolata*.
 - Calyx lobes mostly triangular; leaves entire *L. longiflora* var. *integerrima*.
 - Fertile stamens 4; leaves linear to lanceolate to ovate-lanceolate or broader.
 - Calyx usually densely villosulous; calyx lobes or some of them often dentate
 - L. dependens*.
 - Calyx sparsely puberulent or glabrous; calyx lobes never dentate
 - L. xalapensis*.

Lamourouxia dependens Benth. in DC. Prodr. 10: 539. 1846 (type from Guatemala, the locality not indicated, Skinner). *L. dependens* var. *apiculata* Hunnewell & L. B. Smith, Contr. Gray

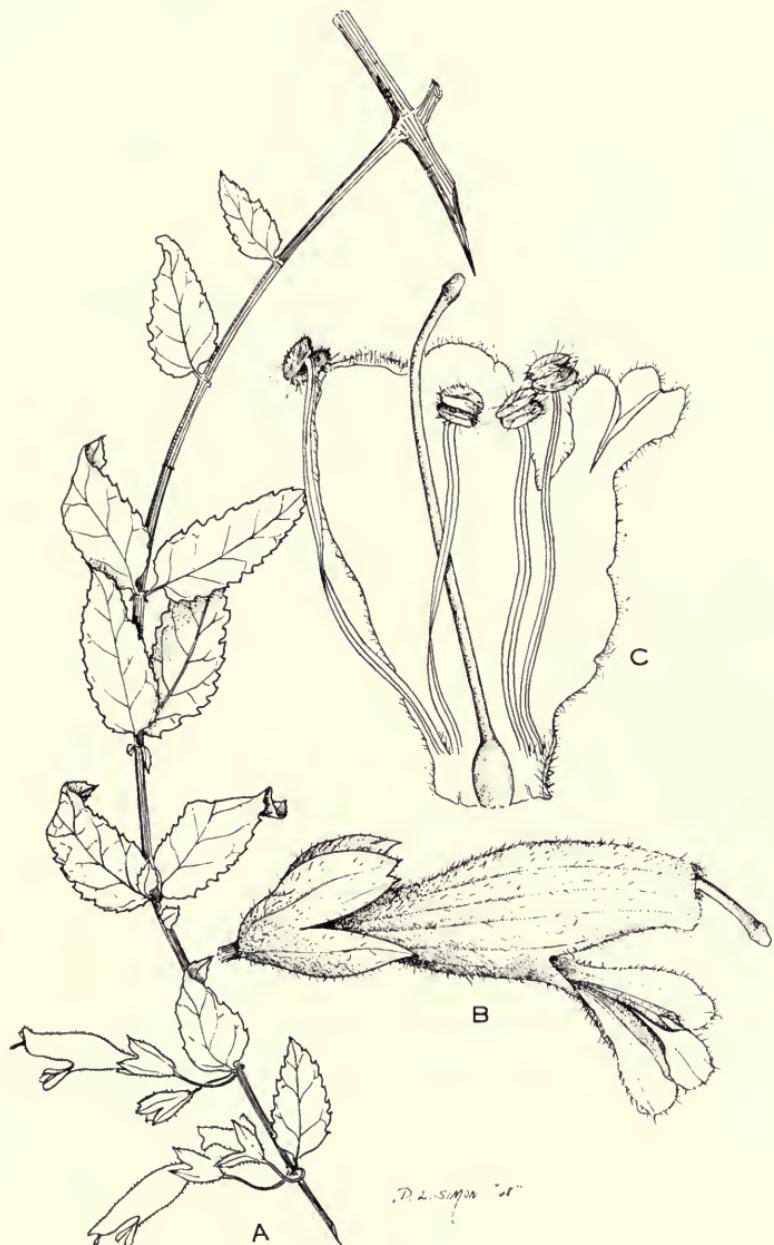


FIG. 79. *Lamourouxia dependens*. A, branch in natural position, $\times \frac{1}{2}$; B, flower, $\times 1\frac{1}{2}$; C, corolla dissected, showing style and stamens, $\times 1\frac{1}{2}$.

Herb. 124: 4. 1939 (type from Santa Elena, Chimaltenango, A. F. Skutch 154); *L. montana* Hunnewell & L. B. Smith, l.c. 4. (type from Volcán de Acatenango, F. W. Hunnewell 14856). *Salviasija de monte*.

Moist or wet thickets or often in rather dense forest, sometimes in *Cupressus* or *Juniperus* forest, frequently on open banks, 1,600–3,800 m.; Jalapa; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Mexico.

Usually a large scandent herb, often somewhat woody below, often forming dense tangles over shrubbery, rarely suberect, the slender brittle stems more or less sordid-tomentose or finally glabrate, the branches mostly spreading or reflexed; leaves short-petiolate, oblong-lanceolate to ovate-lanceolate or oblong-ovate, mostly 2–4 cm. long, acute or obtuse, rounded or very obtuse at the base, coarsely crenate-serrate, densely puberulent to glabrous; flowers orange-red, in dense or lax, terminal racemes, these usually few-flowered; pedicels villosulous or glabrate, 4–10 mm. long; calyx in anthesis 10–14 mm. long, rather densely villosulous, the lobes oblong or triangular-oblong, acute or obtuse, usually somewhat serrulate toward the apex; corolla 4–5 cm. long, rather densely villous, the galea truncate and emarginate at the apex or abruptly short-pointed; capsule broadly ovoid, 1.5 cm. long.

Like most other species of the genus, this is a very showy and handsome plant. The flowers often are abundant, and the vines form dense festoons over large masses of shrubbery.

Lamourouxia longiflora Benth. Pl. Hartw. 22. 1839; in DC. Prodr. 10: 540. 1846. = *L. longiflora* var. *longiflora*.

Rocky slopes and perhaps thickets, 1,600 to perhaps 3,000 m.; Quezaltenango; Huehuetenango; Suchitepéquez; Sololá; El Progreso. Southern Mexico.

Profusely branched shrubs or suffruticose herbs to about 1.5 m. tall, the plants glabrous, except the corolla, or the stems sparsely pubescent above; stems terete, profusely branched; leaves linear or linear-elliptic, acute, glabrous, entire, mostly 1.5–3.5 cm. long and 0.1–0.5 cm. broad; inflorescence of flowers borne in the axils of terminal leaves or bract-like leaves; pedicels slender, 2–5 mm. long; calyx about 8–12 mm. long, campanulate with linear-lanceolate lobes usually longer than the tube, glabrous, with only one nerve in each lobe; corolla red, only slightly ventricose, about 4 cm. long, densely puberulent with short (often bunched), reddish pubescence, dorsal lip slightly galeate, bilobate, the lobes triangular, apiculate, about 4 mm. long from the sinus, ventral lip about 16–19 mm. long, linear-oblong, the apex trilobate, the laterals spreading, each lobe ovate, apiculate, about 2 mm. long, bicarinate within at the base of the lobes; stamens 2, and staminodes 2 (representing the dorsal pair of stamens), the fertile stamens 30–35 mm. long and inserted about 5 mm. above the base of the corolla tube, the anthers about 4 mm. long and 2.5 mm. broad, each cell muticous at the base, the pubescent inner faces adjacent; the staminodes about 2 cm. long, the anthers much reduced and sterile; filaments somewhat swollen, glandular, hairy and geniculate at the base; style



FIG. 80. *Lamourouxia longiflora* var. *longiflora*. A, branch, $\times \frac{1}{2}$; B, calyx and style, $\times 2\frac{1}{2}$; C, corolla dissected showing lobes, stamens and staminodia, $\times 2\frac{1}{2}$, with enlarged base of filament; D, anthers front and back, $\times 5\frac{1}{2}$; E, dehiscent capsule, $\times 2\frac{1}{2}$; F, capsule opened to show placenta and seeds, $\times 2\frac{1}{2}$; G, seed, $\times 20$.

about 4 cm. long, geniculate at the apex, protruding from the galeate dorsal lip; capsule broadly ovate, about 1 cm. long and 8 mm. in diameter; seeds mostly oblong or triangular-oblong, these minutely bullate.

Lamourouxia longiflora var. **integerrima** (Donn.-Sm.) L. Wms. Fieldiana, Bot. 34: 121. 1972. *L. integerrima* Donn.-Sm. Bot. Gaz. 13: 189. 1888 (type from Pansamala, Alta Verapaz, *Tuerckheim* 1112).

Open, rocky, or brushy slopes, mostly 2,000–3,000 m.; Alta Verapaz; Huehuetenango; Quezaltenango; Zacapa; Quiché. Endemic.

Differs from the typical variety in having broader and more triangular calyx lobes, but probably not really distinct.

Lamourouxia longiflora var. **lanceolata** (Benth.) L. Wms. Fieldiana, Bot. 34:121. 1972. *L. lanceolata* Benth. in DC. Prodr. 10: 542. 1846.

Moist or dry, often rocky slopes, or in moist forest, 1,200–3,400 m.; Alta Verapaz; El Progreso; Zacapa; Sacatepéquez; Suchitepéquez; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; El Salvador; Costa Rica.

Plants usually more or less scandent, sometimes suberect, or forming dense erect clumps, with long pendent branches, herbaceous or somewhat woody below, the stems puberulent in lines, the branches divaricate; leaves lanceolate or linear-lanceolate, 2–4 cm. long, acute or acuminate, attenuate at the base, finely serrate or often almost entire, mostly glabrous; flowers bright red, in short or elongate, leafy racemes, pedicellate; calyx 12-costate, glabrous, the campanulate tube 4–5 mm. long, the lobes linear-lanceolate, attenuate, mostly longer than the tube, spreading or sometimes reflexed; corolla 2.5–4.5 cm. long, sparsely or densely tomentose; capsule oval or subglobose, about 8 mm. long.

This is by far the commonest variety of this complex in Guatemala and is distinguished, principally, from the typical variety by its somewhat broader serrate leaves but the division is not always sharp.

Lamourouxia multifida HBK. Nov. Gen. & Sp. 2: 339. 1818. *Guacamaya; flor de carpintero; Julia; tramiete.*

Brushy hillsides or in open rocky places, often in pine or oak forest, 1,450–3,000 m.; Alta Verapaz; Zacapa; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico.

Plants erect or nearly so, perennial, herbaceous, the stems stout, simple or branched, pubescent or glabrate; often tomentose above; leaves small, the lowest

ones bipinnatifid, the upper ones variously dissected, pubescent or glabrate, the segments linear or linear-oblong; flowers bright red, in short or elongate racemes, short-pedicellate; calyx 6–7 mm. long, thinly white-tomentose, the lobes triangular-acuminate, erect, somewhat shorter than the tube; corolla 2.5–4 cm. long, minutely villosulous; capsule ovoid, 8 mm. long.

Lamourouxia viscosa HBK. Nov. Gen. & Sp. 2: 338. 1818. *L. cordata* Cham. & Schlecht. Linnaea 5: 103. 1830. *Hierba de ronrón*; *guacamayo*; *canelón tinto*.

Brushy rocky hillsides or open grassy places, often in pine-oak forest, 2,200 m. or less; Baja Verapaz; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; San Marcos. Mexico. El Salvador to Costa Rica.

Plants stout, erect, perennial, herbaceous, a meter high or less, the stems terete, densely glandular-pilose with short spreading hairs, simple or sparsely branched; leaves oblong or ovate-oblong, mostly 3–7 cm. long, obtuse, sessile, subcordate and clasping at the base, irregularly serrate, densely short-pilose on both surfaces, subcoriaceous, the veins elevated and reticulate beneath; racemes short or elongate, many-flowered, mostly dense, the pedicels short; calyx 8 mm. long, densely glandular-pubescent, the lobes triangular, acuminate, slightly shorter than the tube; corolla brick-red or orange-red, 3.5–5 cm. long, villous-tomentose; capsule ovoid, 8–10 mm. long.

Lamourouxia xalapensis HBK. Gen. & Sp. 2: 338. 1818. *L. stenoglossa* Hunnewell & Smith, Contr. Gray Herb. 124: 4, t. 1, figs. 11–12. 1939.

Mostly in clearings of wet forest or pine forest, at 1,800–3,800 m.; Huehuetenango; Chimaltenango; Quezaltenango; San Marcos; Jalapa. Mexico.

Scandent herbs to about 1 m. long, and much branched, or rarely simple; leaves lanceolate or narrowly ovate-lanceolate, acute or acuminate, crenate or shallowly lacerate-dentate, sessile or short-petiolate, (1–)3–5.5 cm. long and (0.7–)1–2 cm. broad, usually nearly glabrous, rarely somewhat farinose; inflorescence terminal, raceme-like, a single flower borne in axil of leaves or bracts, or usually pairs of flowers borne in axils of opposite leaves; flowers usually red and showy; pedicels slender, ebracteate, mostly 0.5–1 cm. long; calyx subcampanulate, 4-lobate in subequal pairs, glabrous or rarely somewhat puberulent, 7–15 mm. long, the lobes lanceolate to ovate-lanceolate, acute, longer than the tube; corolla red or orange, sparsely to densely puberulent, bilabiate, the dorsal lobe somewhat galeate, the ventral narrow and trilobate; stamens 4 in 2 unequal pairs.

The description is drawn from Guatemalan material. The species as treated here is a variable one; Dr. Ernst has annotated Guatemalan specimens as *L. stenoglossa* and, with reservations, *L. dependens*.

They seem to differ in no significant way from the Mexican *L. xalapensis*.

LEUCOCARPUS D. Don

Tall coarse herbs, glabrous or somewhat pubescent, the stems tetragonal and often narrowly 4-winged; leaves opposite, narrow, narrowed to the base and cordate-amplexicaul, serrulate, herbaceous; inflorescence a few-many-flowered, short-pedunculate axillary cyme; flowers rather small, yellow, the bracts small and narrow; calyx membranaceous, tubular-campanulate, conspicuously 5-costate, the 5 teeth setaceous; corolla tube elongate, ampliate above, the lips spreading, the posterior one outside in bud, the anterior lip 3-parted, barbate at the base; stamens 4, didynamous, inserted below the middle of the tube, included; anther cells distinct, divergent or finally divaricate; staminodia none; style thickened at the apex, the 2 laminae oblong; ovules numerous; fruit baccate, globose, indehiscent, the pericarp thin; seeds very numerous, minute, immersed in pulp, subglobose, the testa appressed, reticulate.

The genus consists of a single species. It is the only genus of the tribe Gratioleae in Central America with a cymose inflorescence.

Leucocarpus perfoliatus (HBK.) Benth. in DC. Prodr. 10: 335. 1846. *Mimulus perfoliatus* HBK. Nov. Gen. & Sp. 2: 371. 1817. *L. alatus* D. Don in Sweet, Brit. Fl. Gard. II. t. 124. 1830.

Wet thickets or forest, sometimes in moist open places, often at the edge of water or in pine-oak forest, 1,300–2,500 m.; Alta Verapaz; Baja Verapaz; El Progreso; Zacapa; Guatemala; Chimaltenango; Suchitepéquez; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; El Salvador; Honduras; Costa Rica; Panama; southward to Bolivia.

Plants stout, simple or sparsely branched, somewhat succulent, a meter high or less, the stems glabrous; leaves sessile and amplexicaul, narrowly lanceolate or linear-lanceolate, mostly 10–25 cm. long, long-attenuate; cymes 4–7 cm. long, umbelliform or compound, long-pedunculate, the pedicels usually pubescent; calyx 7–9 mm. long, sparsely or densely pubescent, the teeth very short, erect; corolla 15 mm. long, the lobes small; fruit globose, white and succulent at maturity, 1 cm. in diameter or larger.

When growing this plant may be recognized by its yellow flowers, its narrowly winged four-sided stem and especially by its white, globose fruits. In dried specimens it is sometimes difficult to detect the fleshy nature of the fruits.

LIMOSELLA L.

Very small herbs, growing in shallow water or on mud, caespitose or floating, almost acaulescent or the stems stolon-like and rooting at the nodes; leaves radical

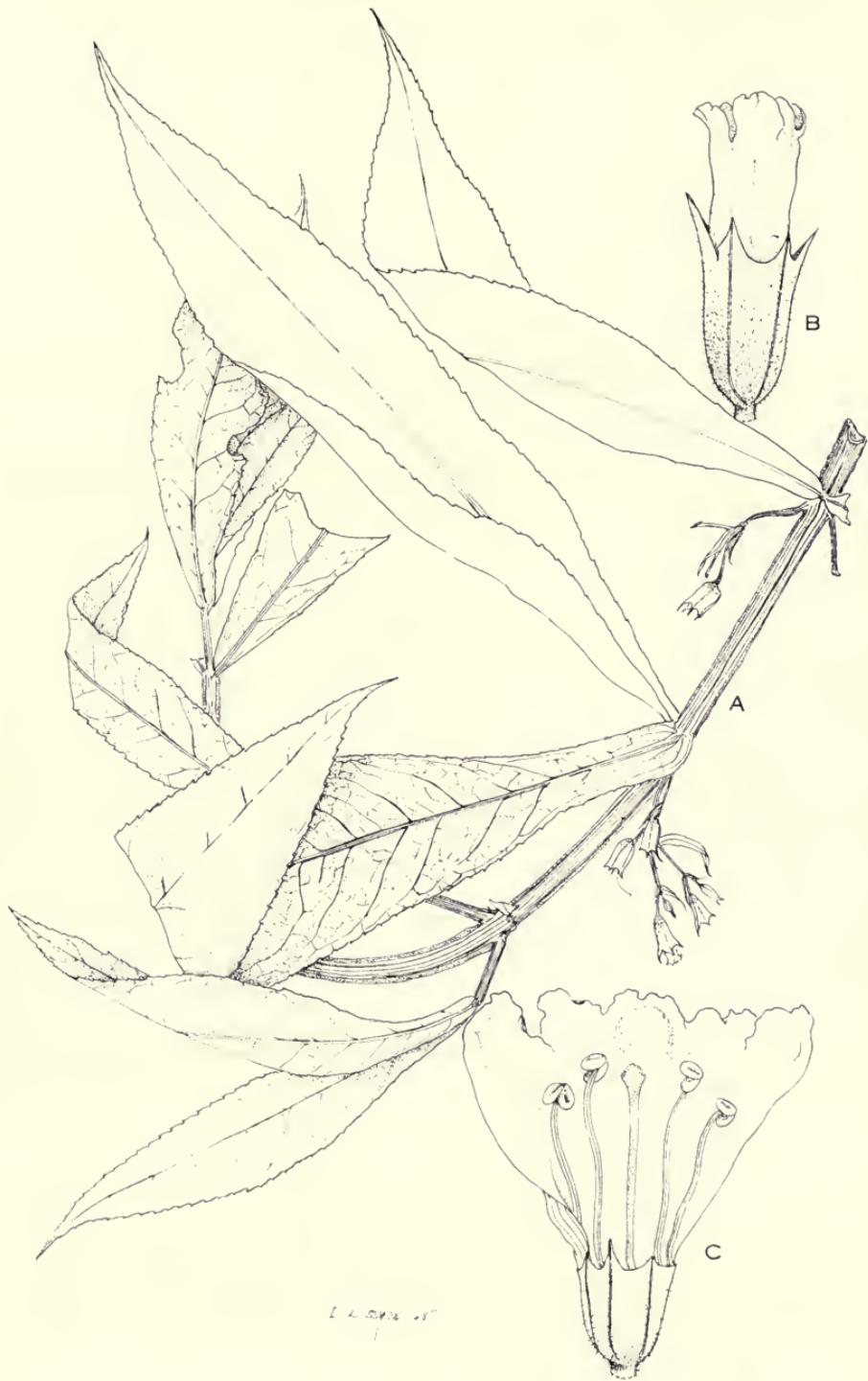


FIG. 81. *Leucocarpus perfoliatus*. A, terminal part of plant, $\times \frac{1}{2}$; B, flower at anthesis, $\times 6$; C, flower past anthesis, partially dissected, $\times 3$.

or fasciculate at the nodes of the stems, the petioles long and linear, or dilated at the apex into an oblong or ovate blade; pedicels ebracteolate, inserted among the leaves, usually shorter than the leaves; inflorescence axillary, 1- or perhaps 2-flowered, flowers very small, white or pinkish; calyx campanulate, 5-dentate; corolla tube short, subrotate-campanulate, the limb 3-4-5-fid, spreading, the lobes rounded or ovate-oblong, subequal, imbricate in bud; stamens 4 (or perhaps fewer), inserted on the tube, usually short-exserted, the filaments filiform; anther cells completely confluent, 1-celled; ovary shortly 2-celled at the base, the septum evanescent above; style short, thickened and incurved at the apex; ovules numerous; capsule subin dehiscent or finally bivalvate, the valves entire; seeds small, ovoid, striate and rugose.

Species about 15, widely dispersed in chiefly temperate regions, most of them in South Africa. Only one is known in Mexico and Central America.

Limosella acaulis Sessé & Mociño, Fl. Mex. ed. 2: 143. 1894; L. Wms. Fieldiana, Bot. 34: 121. 1972. *L. americana* Glück, Notizbl. Bot. Gart. Berlin 12: 75. 1934, and *formae natans, submersa, and terrestris* Glück, l.c. 75, 76.

In muddy pools or sometimes in marshy meadows, 3,300-3,700 m.; Huehuetenango. Mexico; to be expected in Costa Rica and Panama on high volcanoes; Venezuela; Peru; Bolivia; perhaps Argentina.

Plants acaulescent or with elongate, very slender stems rooting at the nodes, glabrous throughout; leaves linear, or often dilated above and lanceolate-linear, mostly 2-3 cm. long; pedicels slender, shorter than the leaves; flowers white, scarcely more than 2 mm. long, the corolla about 2 mm. broad.

There is a question as to the proper specific name of our plant but the one used here is probably correct. The plant is a very small one and probably is more common than the collections would indicate.

LINARIA Hill.—The genus *Linaria* has been collected once in Guatemala and must be rare there if it exists still. Neither of the authors of this work has seen or collected it there. The specimen available is *Linaria vulgaris* Hill or one of the closely related European species, that are often cultivated.

LINDERNIA Allioni

Small, branched, usually annual plants, glabrous or sparsely pubescent; leaves opposite, entire or remotely dentate; flowers small, white, blue, or purplish, solitary in the leaf axils, or the upper ones forming a terminal raceme, the pedicels ebracteolate, often reflexed in fruit; calyx 5-parted, the segments narrow, scarcely imbricate; corolla tube cylindric or somewhat ampliate above, the posterior lip



FIG. 82. *Limosella acaulis*. A, habit, showing 4-merous flower, $\times 3$; B, 5-merous flower, $\times 10$. *Lindernia anagallidea*. C, plant, $\times 1$; D, flower, $\times 5$.

outermost in bud, erect, broad, concave, shallowly bifid, the anterior lip larger, spreading, the 3 lobes broad, subequal; perfect stamens 2 or 4, inserted on the corolla tube, subincluded, the filaments filiform, 2 staminodia present when the perfect stamens are only 2; anther cells divaricate; style bilamellate at the apex; ovules numerous; capsule ovoid or short-oblong, septicidally dehiscent, the valves thin, entire; seeds numerous, foveolate-rugose.

Species presumed by Thieret to be about 70 in temperate and tropical regions of both hemispheres, but the generic limitations in this group of Scrophulariaceae is illusory. There are no other species in Central America. The genus usually has been called *Ilysianthes* Raf., but Pennell has pointed out that the application of that name is obscure and that it must be discarded. We have followed Thieret in placing *Vandellia* L. as a synonym of *Lindernia*, but with misgivings.

Calyx lobate to about the middle; leaves petiolate, often shortly so.

Flowers long pedicellate; capsules less than 5 mm. long..... *L. crustacea*.
Flowers sessile; capsules more than 8 mm. long..... *L. diffusa*.

Calyx lobate to the base or nearly so; leaves sessile.

Pedicels usually longer than the leaves; leaves mostly 1-2 cm. long..... *L. anagallidea*.
Pedicels mostly shorter than the leaves or scarcely equaling them; leaves mostly 0.4-0.8 cm. long..... *L. rotundifolia*.

Lindernia anagallidea (Michx.) Pennell, Monogr. Acad. Sci. Phila. 1: 152. 1935. *Gratiola anagallidea* Michx. Fl. Bor. Am. 6. 1803.

Wet fields or margins of bogs, 1,500 m. or less; Izabal; Chiquimula; Jalapa; Jutiapa; Retalhuleu. United States; Mexico; British Honduras to Panama; West Indies; South America.

Plants slender, much branched, creeping or procumbent, glabrous throughout, the stems mostly 10-20 cm. long; leaves sessile, ovate or rounded-ovate, 1-2 cm. long, 3-7-nerved, obtuse or rounded at the apex, rounded or somewhat clasping at the base, remotely denticulate or entire; pedicels usually much longer than the leaves; calyx segments linear, 2 mm. long; corolla 7 mm. long, white and violet or purple; capsule ovoid-oblong, obtuse, 4-6 mm. long; seeds reddish, 2 mm. long.

This has been reported from Guatemala as *Ilysianthes riparia* Raf., and the name *I. dubia* (L.) Barnhart has been applied to Central American collections of the species in recent years.

Lindernia crustacea (L.) F. Muell. Syst. Cens. Austral. Pl. 97. 1882. *Capraria crustacea* L. Mant. Pl. 87. 1767. *Torenia crustacea* Cham. & Schlecht. Linnaea 2: 570. 1827.

Moist or wet, open places, often a weed in lawns or waste ground, at or little above sea level; Izabal (Puerto Barrios); Suchitepéquez

(Tiquisate). Native of the Old World tropics; naturalized in many parts of tropical America; British Honduras to Panama, along the Atlantic coast.

A low slender annual, erect or decumbent, very sparsely and inconspicuously scaberulous on the stems and leaves, the stems mostly 10 cm. long or shorter; leaves short-petiolate, broadly ovate, deltoid-ovate, or rounded-ovate, mostly 7-15 mm. long, obtuse, rounded or subcordate at the base, remotely crenate-dentate or entire; pedicels very slender, usually longer than the leaves; calyx glabrous, 3.5 mm. long, 5-costate, lobate half its length, or the lobes or teeth often less than half as long as the tube; corolla purple or pale lilac, little longer than the calyx; capsule rounded at the apex, scarcely exceeding the calyx.

Lindernia diffusa (L.) Wettst. ex Durand & Jackson, Index Kew. suppl. 1: 248. 1906. *Vandellia diffusa* L. Mant. Pl. 1: 89. 1767.

Moist thickets or fields, sometimes in waste ground about dwellings or on gravel bars along streams, 1,000 m. or less; Alta Verapaz; Izabal; Santa Rosa; Retalhuleu; Quezaltenango. Southern Mexico; British Honduras to Panama; perhaps introduced into America from the Old World tropics, where the species is widely dispersed.

Plants diffusely spreading, the stems angulate, often rooting at the nodes, mostly 20 cm. long or shorter, the whole plant sparsely pubescent or almost glabrous; leaves petiolate, broadly ovate to orbicular, 1-2 cm. long, rounded at the



FIG. 83. *Maurandya barclaiana*. A, part of plant with flowers and bud, $\times 1$; B, seeds, $\times 10$. After Lindley, in part, in Bot. Reg. 13; t. 1108. 1827, in part from Mexican specimens.

apex and base, obscurely or conspicuously crenate; pedicels very short, solitary; calyx tube narrowly obpyramidal or tubular, 3-4 mm. long, the teeth lanceolate, acuminate, accrescent in age; corolla white, little exceeding the calyx; capsule narrowly oblong, attenuate, 8-11 mm. long.

Lindernia rotundifolia (L.) Standl. & L. Wms. *Fieldiana, Bot.* 34: 122. 1972. *Gratiola rotundifolia* L. *Mant. Pl.* 1: 174. 1767. *Ilysanthes rotundifolia* Benth. in DC. *Prodr.* 10: 420. 1846.

A weed in lawn, near sea level; Izabal (*Steyermark 38796*); unknown elsewhere on continental North America. Native of the Old World tropics; naturalized in the West Indies and northern South America.

A small slender annual, almost glabrous, diffusely branched, the stems 20 cm. long or less, creeping, often rooting at the nodes; leaves sessile and often somewhat amplexicaul, ovate to orbicular, 4-10 mm. long, obtuse or rounded at the apex, 3-5-nerved, entire or nearly so, punctate; flowers solitary in the leaf axils, the pedicels usually shorter than the leaves, sometimes slightly exceeding them, spreading or deflexed in fruit; calyx 2 mm. long, the lobes lanceolate, acute; corolla 4-6 mm. long, white; capsule subglobose, somewhat longer than the calyx.

MAURANDYA Ortega

Reference: Philip A. Munz, *Maurandya* *Proc. Calif. Acad. Sci.* 15: 382. 1926.

Usually herbaceous vines, glabrous or pubescent; leaves alternate or the lowest one opposite, hastate, angulate-lobate, or coarsely dentate; pedicels axillary, ebracteate, the flowers usually showy and violet, purple, or rose; calyx 5-6-parted, the segments usually narrow; corolla tube scarcely gibbous at the base, the lips spreading, the posterior one outside in bud, bifid, the anterior lip 3-parted; stamens 4, didynamous, included, the filaments thickened above; anthers sublateral, the cells divaricate, finally confluent; style scarcely dilated at the apex, very shortly bilobate; ovules numerous; capsule globose, sometimes slightly oblique, dehiscent by 2 irregular subapical openings; seeds thick, tuberculate or rugulose, sometimes winged.

Eight species are known, all in Mexico and Central America. Only the following are known in Central America.

Leaves sparsely or densely villous, dentate; sepals obtuse or subacute	<i>M. erubescens.</i>
Leaves glabrous, not dentate; sepals narrowly long-attenuate.	
Sepals glabrous.....	<i>M. scandens.</i>
Sepals glandular-pilose.....	<i>M. barclaiana.</i>

***Maurandya barclaiana* Lindl. *Bot. Reg.* 13: t. 1108. 1827.**

Native of southern Mexico, and perhaps indigenous in western Guatemala, although known from that country at present only in cultivation; occasionally grown in gardens for ornament.

A slender herbaceous vine, glabrous except on the sepals; leaves long-petiolate, triangular-cordate, often triangular-hastate, 1–3.5 cm. long, acute to attenuate, the basal lobes acute or obtuse; pedicels 3–5 cm. long; calyx 5-parted almost to the base, glandular-pilose with slender several-celled hairs, the segments linear-lanceolate, 10–13 mm. long, narrowly long-attenuate, in fruit as much as 2 cm. long; corolla deep purple, 3–4.5 cm. long, the lobes rounded; capsule globose, 1 cm. long; seeds oblong, 1–1.5 mm. long, with irregular corky tuberculate ridges, not winged.

This plant is occasional in gardens in other parts of Central America also. The illustration shows the unusual seeds of this species, which Lindley commented on at length.

Maurandya erubescens (D. Don) Gray, Proc. Am. Acad. 7: 377. 1868. *Lophospermum erubescens* D. Don in Sweet, Brit. Fl. Gard. II. 1: t. 75. 1830. *M. erubescens* var. *glabrata* I. M. Johnston, Proc. Calif. Acad. Sci. IV. 12: 1164. 1924.

Moist or wet, mixed forest or thickets, 1,500–2,800 m.; Quiché; Quezaltenango; San Marcos. Central and southern Mexico. An escape from cultivation in several countries.

A slender herbaceous vine, climbing by twining petioles and pedicels, the stems glandular-puberulent or pilose; leaves thin, triangular-hastate, triangular-cordate, or obscurely 5-lobate, 15 cm. long or usually much smaller, acuminate, cordate at the base, sparsely or densely villous; pedicels 2–6 cm. long, villous; calyx 5-parted, sparsely to densely villous, the segments erect in anthesis, spreading in fruit, ovate or broadly ovate, obtuse or subacute, 1.5–2 cm. long; corolla deep rose-purple, 4–7 cm. long, glabrate or finely pubescent outside; capsule subglobose, 1.5 cm. long, pubescent; seeds brown, oblong, coarsely corky-tuberculate, with a broad pale lacerate wing.

The typical variety of the species is densely villous throughout but in var. *glabrata* the pubescence is sparser and the leaves are glabrate, although some pubescence always is present on them.

Maurandya scandens (Cav.) Pers. Syn. Pl. 2: 15, t. 160. 1807. *Usteria scandens* Cav. Icon. 2: t. 116. 1793. *M. semperflorens* Ortega, Nov. Gen. Dec. 2: 21. 1797. *Cundeamor*.

Rare in hedges or thickets, perhaps an escape from cultivation; often planted for ornament in Guatemala, 1,200–1,800 m.; Alta Verapaz; Sacatepéquez; Chimaltenango. Mexico. An escape in many places in the tropics.

A slender herbaceous vine, climbing by twining petioles and pedicels, glabrous throughout; leaves slender-petiolate, triangular-cordate, sometimes obscurely 5-lobate, acute or acuminate, 2–5 cm. long; pedicels 5–10 cm. long; calyx glabrous, the sepals lance-linear, long-attenuate, 12–15 mm. long or in fruit as much as 20 mm. long; corolla pale purple or rose-pink, 3.5–4.5 cm. long, finely glandular-puberulent outside; capsule globose, glabrous, 1.5 cm. long; seeds oblong, 1–1.5 mm. long, brown, with a few irregular corky tuberculate ridges, not winged.



FIG. 84. *Melasma physalodes*. A, upper part of plant, $\times \frac{1}{2}$; B, corolla dissected to show lobing and stamens, $\times 1\frac{1}{2}$; C, calyx dissected to show pistil and style, $\times 1\frac{1}{2}$.

Called "chulita" and "cortiñita" in El Salvador. It is doubtful whether this plant is native in Guatemala, but it has established itself in hedges in several places, especially about Cobán. The large flowers are delicately colored, and the vine often is more than ordinarily attractive when well grown.

MELASMA Bergius

Reference: Beitrag zur Kenntnis der Gattung *Melasma*, Notizbl. Bot. Gart. Berlin 15: 119-127. 1946.

Coarse, annual or perennial herbs, pubescent or hirsute; leaves opposite, usually dentate, blackening when dried; flowers small, pedunculate, axillary or in terminal bracteate spikes or racemes; calyx campanulate, 5-lobate; corolla tube subcampanulate, short, the limb oblique, spreading, the anterior lobes exterior in bud; stamens 4, didynamous, the anther cells parallel; style usually elongate; capsule subglobose; seeds numerous, linear.

About 20 species, in the tropics of both hemispheres. Only the following is found in North America.

Melasma physalodes (D. Don) Melchior, Notizbl. Bot. Gart. Berlin 15: 122. 1940. *Lophospermum physalodes* D. Don, Trans. Linn. Soc. 15: 353. 1827. *Lyncea hispida* Schlecht. & Cham. Linnaea 5: 109. 1830. *Melasma hispida* Benth. Comp. Bot. Mag. 1: 202. 1835. *Cacabus hondurensis* Donn.-Sm. Bot. Gaz. 56: 60. 1913. *Eutheta hondurensis* Standl. Field Mus. Bot. 8: 325. 1931.

Moist or wet thickets or mixed forest, 1,200-1,500 m.; Chiquimula; Santa Rosa; Guatemala; Huehuetenango. Central and southern Mexico; Honduras.

A coarse branched herb 1-2 m. high, hispidulous throughout and very rough to the touch; lower leaves alternate, short-petiolate, the upper ones pseudoopposite, lanceolate, 10 cm. long or shorter, acuminate, attenuate to the base, sinuate-denticulate or subentire; upper leaves reduced and bract-like; flowers subopposite, on peduncles 2 cm. long or shorter; calyx in anthesis about 2 cm. long, pentagonal-campanulate, 5-lobate, the lobes triangular, shorter than the tube; corolla white, glabrous outside, about 3.5 cm. long, the lobes oval, rounded at the apex; capsule subglobose, 1-1.5 cm. long, included in the calyx; seeds elongate-cuneiform, 3 mm. long, the testa laxly reticulate.

In fruiting state the calyx strongly resembles that of the genus *Physalis*, and the plant has been described at least twice in recent years in the Solanaceae.

MICRANTHEMUM Michaux

Small, slender prostrate herbs, diffuse and much branched. Leaves opposite, small, entire, usually ovate or orbicular, often 3-5-nerved; inflorescence axillary, 1-(2-)flowered; flowers minute, subsessile, often in alternating axils of leaves; calyx 4-5-lobate or nearly entire; corolla bilabiate nearly to the base, the tube very short, posterior lip very short and entire, anterior lip trilobate; stamens 2, inserted in the sini of mid-lobe of anterior lip, anthers bilocular; style minute, the apex bilobate or bilamellate (apparently stigmatose on inner faces); capsule globose (ours), imperfectly bilocular (or unilocular); seeds numerous, rugose, 4-ridged.

Perhaps as many as 20 species mostly in the West Indies. Eastern United States, Mexico, and Guatemala; West Indies; South America.

Small plants of the forest floor and almost certainly usually overlooked. The flowers are minute but apparently produced in abundance.

Micranthemum standleyi L. Wms. *Fieldiana, Bot.* 34: 124. 1972.

Damp thickets near Ayutla, Dept. San Marcos, *Standley* 68810 (type). Endemic.

Very small prostrate much branched herbs rooting at the nodes, the stems to 5 cm. long or longer. Leaves opposite, small, glabrous, elliptic-oval, or obovate to suborbicular, obtuse, 3-nerved, sessile, 2-3 mm. long and 1.2-2.5 mm. broad; inflorescences single flowers in leaf axils, pedicels about 0.5 mm. long; flowers minute, up to 0.75 mm. long at anthesis, calyx lobes 4, oblanceolate, obtuse, ciliate and pubescent dorsally with crisped hairs, 0.5-0.7 mm. long; corolla bilabiate, divided to near the base, about 0.6 mm. long, posterior lip short, undivided, anterior lip trilobate, the middle lobe largest and with the 2 stamens inserted along its sini; anthers about 0.12 mm. broad, the 2 locules explanate; style 0.2-0.3 mm. long, bilamellate and slightly geniculate at the apex; immature capsule subglobose, 0.7-0.9 mm. long; seeds not seen.

MIMULUS L.

Reference: Adele L. Grant, A monograph of the genus *Mimulus*, *Ann. Mo. Bot. Gard.* 11: 98-388. 1924.

Annual or perennial herbs, rarely shrubs, glabrous or pubescent, often with viscid pubescences; leaves opposite, sessile or petiolate, entire or dentate, rarely lobate; flowers small or large, solitary in the leaf axils, often forming terminal racemes; calyx tubular or campanulate, 5-angulate, 5-dentate, persistent and often accrescent, the teeth equal or unequal; corolla bilabiate or equally lobate, usually yellow or red, sometimes blue, the tube cylindric or funnelform; upper lip outermost in bud, bilobate, erect or spreading; lower lip generally longer, trilobate, usually with 2 pubescent protuberances in the throat; stamens 4, didynamous, included or exserted, the filaments usually glabrous, adnate in the lower part of the corolla, the anther cells more or less divaricate, confluent at the apex; stigma



FIG. 85. *Micranthemum standleyi*. A, portion of repent plant, $\times 7\frac{1}{2}$; B, flower, $\times 25$; C, diagrammatic sketch of calyx and corolla, $\times 20$; D, mid-lobe of corolla showing attachment of stamens, $\times 45$; E, flower with nearly mature capsule, $\times 25$; F, seed, $\times 35$. Drawn from holotype.

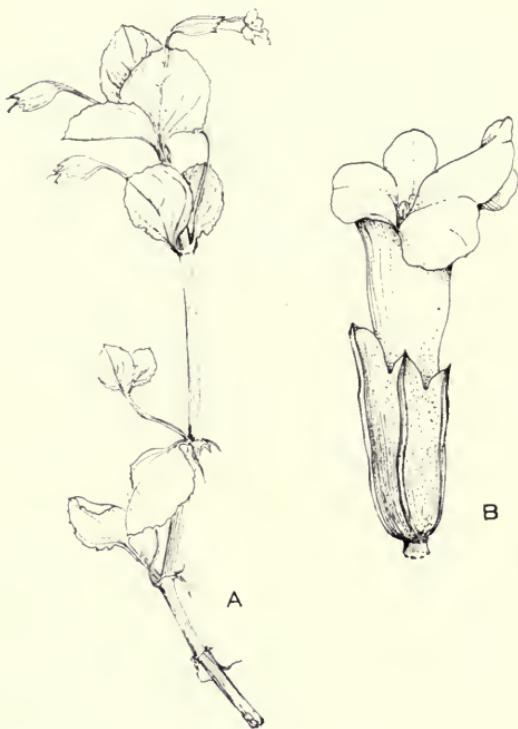


FIG. 86. *Mimulus glabratus*. A, habit, $\times \frac{1}{2}$; B, flower, $\times 3$.

bilamellate or peltate-funnel-form; capsule oblong or linear, membranaceous to cartilaginous, loculicidal, rarely indehiscent; seeds numerous, small, oval, smooth or reticulate.

Species more than 100, half of them confined to the state of California, the others widely dispersed, chiefly in temperate regions. Very few are known from the Old World, and none are native in Europe. No others are found in Central America.

Calyx teeth conspicuously unequal; upper leaves sessile, entire or nearly so
M. glabratus.
 Calyx teeth about equal in length; upper leaves petiolate, coarsely dentate
M. pachystylus.

***Mimulus glabratus* HBK. Nov. Gen. & Sp. 2: 370. 1817.**

Wet soil, often along the borders of streams, at the foot of wet cliffs, or on sand bars along streams, sometimes in pine-oak forest, 1,500–3,500 m.; Guatemala; Sacatepéquez; Chimaltenango; Totonicapán; Huehuetenango; Quezaltenango; San Marcos. United States; Mexico; Colombia; southern South America.

Plants perennial, usually 30 cm. high or less, glabrous or very sparsely villous or puberulent, succulent, sometimes growing in water, erect or ascending, often with creeping stems that root at the nodes; lower leaves petiolate, the upper ones sessile and clasping, broadly ovate to orbicular, 1–5 cm. long, irregularly undulate-dentate or entire, rounded at the apex, palmately 3–5-nerved; pedicels slender, longer or shorter than the leaves; calyx campanulate, 5–8 mm. long, in fruit 10–12 mm. long, the teeth broad, the upper one much longer than the others; corolla bright yellow, 7–15 mm. long; capsule oblong, rounded at the apex, shorter than the calyx; seeds oval, longitudinally striate.

This has been reported from Guatemala as *M. jamesii* Torr. & Gray. It is a rather handsome and showy plant, confined to very wet soil, or at edge of streams.

Mimulus pachystylus Grant, Ann. Mo. Bot. Gard. 11: 234. 1924.

Wet rocks about waterfalls or on wet banks along streams, 1,300–2,900 m.; Huehuetenango; San Marcos. Mexico (Chiapas).

Plants perennial, creeping and forming dense mats, the stems 10–25 cm. long, viscid-pilose with long soft hairs; leaves all petiolate, broadly ovate, 1–3 cm. long, acute, rounded to acute at the base, often abruptly contracted and decurrent, coarsely dentate, pinnate-nerved, glabrous or nearly so, the petioles viscid-pilose; pedicels shorter than the leaves; calyx campanulate or tubular, 10 mm. long or shorter, almost glabrous; corolla yellow, 13–14 mm. long; capsule ovoid.

PEDICULARIS Linnaeus

Herbs, usually perennial; leaves alternate or verticillate, rarely subopposite, often chiefly radical, usually one or more times pinnatifid, sometimes merely dentate, the floral leaves smaller and often bract-like; flowers medium-sized, in terminal, dense or lax spikes, rarely racemose, ebracteolate; calyx tubular or campanulate; cleft anteriorly and often posteriorly, 2–5-dentate at the apex; corolla tube cylindric or slightly ampliate above, the limb bilabiate, the posterior lip erect and galeiform, the anterior lip trilobate; stamens 4, didynamous, ascending under the galea, the anthers transverse, approximate by pairs, the cells distinct, equal, parallel; style subcapitate-stigmatose; ovules numerous; capsule compressed, ovate or lanceolate, more or less falcate or oblique, often rostrate, loculicidally dehiscent; seeds numerous, reticulate, foveolate, striate, or multicostate.

Species perhaps 150 or more, widely distributed in temperate and arctic regions, few in the tropics and there confined to the high mountains. Only one in Central America.

Pedicularis orizabae Schlecht. & Cham. Linnaea 5: 103. 1830.
Jazmin.

Dry, open rocky slopes, sometimes on limestone and in *Juniperus* forest, about 3,700–3,800 m.; Quezaltenango (summit of Volcán de



FIG. 87. *Pedicularis orizabae*. A, habit, $\times \frac{1}{2}$; B, flower, $\times 3$; C, segment of leaf, $\times 5$.

Zunil); Huehuetenango (Sierra de los Cuchumatanes). Central and southern Mexico.

Plants erect, 60 cm. high or less, glabrous, the stems simple, stout; radical leaves numerous, 17 cm. long or less, 1-2 cm. broad, pinnately parted, the very numerous lobes spreading, lanceolate, incised-dentate; caudine leaves similar but smaller, numerous, the uppermost much reduced and bract-like; spikes rather dense and many-flowered, 6-17 cm. long or in fruit much longer; calyx in anthesis 8 mm. long, the teeth entire or serrulate; corolla at least in part purple or rose-purple, 1.5-2 cm. long, the galea strongly incurved and short-rostrate, the lobes of the lower lip broad, 8 mm. long; capsule 1.5 cm. long or shorter.

PENSTEMON Mitchell

Perennial herbs or rarely low shrubs, mostly erect, the stems simple or branched, glabrous or pubescent; leaves opposite, the radical and lower caudine leaves often petiolate, the uppermost caudine leaves sessile and often clasping, frequently bract-like; peduncles dichotomously several-flowered, forming terminal panicles or thyrses; flowers small or rather large, mostly blue, purple, red, or white, often very showy; calyx 5-parted, the segments imbricate; corolla tube generally elongate, equal or ventricose, the limb bilabiate, the posterior lip erect, concave, bilobate at the apex, sometimes more spreading and deeply parted, the anterior lip spreading, trifid, sometimes barbate within; stamens 4, didynamous, declinate at the base, ascending at the apex, shorter than the corolla, the filaments filiform; anthers glabrous or lanate, the cells distinct or confluent at the apex; a staminode present, barbate or naked, filiform or thickened above; style filiform, capitate-stigmatose; ovules numerous; capsule septicidally dehiscent, the valves entire or bifid; seeds numerous, not marginate.

Species perhaps 250, almost all in temperate North America; in the tropics confined to the mountains, the following being the only Central American species.

Stems densely viscid-pilose; leaves very finely serrate *P. perfoliatus*.
Stems glabrous outside the inflorescence.

Leaves serrate; calyx lobes lanceolate, acute or attenuate *P. campanulatus*.
Leaves entire; calyx lobes broadly ovate, obtuse *P. gentianoides*.

***Penstemon campanulatus* (Cav.) Willd. Sp. Pl. 3: 228. 1800.**
Chelone campanulata Cav. Icon. Pl. 1: 18, t. 29. 1791.

Not represented in recent Guatemalan collections but reported by Bentham and by Hemsley as collected in Guatemala, without definite locality by Skinner, and by Godman and Salvin on Volcán de Fuego. Widely distributed in the mountains of Mexico.

Plants erect, 50-75 cm. high, the stems rather slender, mostly simple, very leafy, glabrous or nearly so; leaves all sessile or nearly so, most of them linear-lanceolate, the upper ones often broader and with somewhat dilated bases, long-

attenuate, sharply serrate; panicles many-flowered, rather lax and open, usually raceme-like, the peduncles several-flowered, the flowers slender-pedicellate; calyx 6 mm. long or sometimes longer, the segments lanceolate, attenuate-acute, sometimes sparsely pubescent, blue or bluish purple, 2-2.5 cm. long, sometimes very sparsely short-villous outside; capsule ovoid, 1 cm. long.

Penstemon gentianoides (HBK.) Poiret, Dict. Sci. Nat. 38: 385. 1825. *Chelone gentianoides* HBK. Nov. Gen. & Sp. Pl. 2: 363, t. 172. 1818. *Penstemon skutchii* Straw, Bol. Soc. Bot. Mex. No. 27: 13. 1962 (type, *Skutch 1250*). *Campanola*.

Open brushy slopes or more commonly in or near *Pinus* or *Abies* forests or sometimes limestone areas in *Juniperus* forests, mostly 2,400-4,000 m., sometimes planted as an ornamental; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Mexico.

Plants erect, stout and coarse, a meter high or less, the stems simple or sparsely branched, the whole plant glabrous except sometimes in the inflorescence; leaves all except the lowest sessile, lanceolate or linear-lanceolate, thick, entire, 10 cm. long or shorter, long-attenuate, the lower ones acute at the base, the upper ones rounded or subcordate and clasping; peduncles several-flowered, forming an elongate thyrsiform inflorescence, this usually rather dense and many-flowered, the pedicels elongate or very short; calyx lobes 8 mm. long, broadly ovate, elliptic, or even rounded, very obtuse, glabrous or obscurely pubescent; corolla 2.5-3.5 cm. long, glabrous or very sparsely pubescent outside, variable in color, rose or orchid-purple, or sometimes red with a white throat; capsule ovoid, 8 mm. long.

This is a favorite garden plant of the Guatemalan highlands, and the flowers often are sold in the markets. Although usually a stout herb a meter high or less, the plants are sometimes more or less shrubby and almost 2 m. high.

Penstemon perfoliatus A. Brongn. Hortic. Univ. 5: 265. 1844.

Planted occasionally in gardens for ornament, especially in San Marcos and elsewhere in the western highlands; native of central and southern Mexico, and dubiously also in Guatemala.

A tall and rather coarse plant, a meter high or less, the stems mostly simple stout, densely viscid-villous with short spreading hairs; cauline leaves sessile and amplexicaul, lanceolate or ovate-lanceolate, mostly 7-10 cm. long, long-attenuate, very finely serrulate or often subentire, densely short-villous on both surfaces or finally glabrate; inflorescence narrowly paniculate or raceme-like, very leafy, the cymes few-flowered, short-pedunculate, the flowers densely crowded; calyx 1 cm. long, densely viscid-villosulous, the segments lance-ovate or broadly ovate, obtuse or subacute; corolla rose-pink or purplish blue, 3-4 cm. long, glabrate or somewhat pubescent outside, the tube broad and much dilated above.



FIG. 88. *Penstemon gentianoides*. A, portion of plant, $\times \frac{1}{2}$; B, flower, $\times 1\frac{1}{2}$; C, dissection showing lobation, the stamens, staminode, and pistil, $\times 2$.

RUSSELIA Jacquin

References: B. L. Robinson, the genus *Russelia*, Proc. Am. Acad. 35: 319-321. 1900; Margery C. Carlson, Monograph of the genus *Russelia*, Fieldiana, Bot. 29: 231-292. 1957.

Plants perennial, erect or often with recurved or pendent branches, herbaceous or somewhat woody below, glabrous or pubescent, the stems angulate or terete; leaves opposite or verticillate, entire or dentate, usually sessile or nearly so, sometimes reduced to scales; flowers rather small, usually bright red, in dichotomous cymes, these lax or dense; calyx deeply 5-fid or 5-parted, the segments strongly imbricate; corolla tube cylindric, the limb somewhat bilabiate, 5-lobate, the lobes rounded, plane and spreading, subequal, the 2 posterior ones outside in bud; stamens 4, didynamous, included; anther cells divaricate, confluent at the apex; staminodium very short or none; style filiform, scarcely thickened at the apex, minutely stigmatose; ovules numerous; capsule subglobose or void, septicidally dehiscent, the valves bifid; seeds numerous, ovoid, exalate, inserted among long dilated membranaceous-hyaline hairs rising from the receptacle.

The some 52 species of this genus are almost entirely limited to North America; only *R. sarmentosa* reaches to South America and it is known there by a single collection. Several species of the genus appear to be narrow endemics as are six of the ones recorded here from Guatemala. Two or three Russeliae are to be found in horticulture.

We have adapted the pertinent part of Dr. Carlson's monograph, cited above, to the "Flora of Guatemala" with little change. We appreciate her permission to do this.

Plants rush-like, the branches slender, numerous, verticillate; inflorescence 2-flowered; corolla glabrous inside..... *R. equisetiformis*.
Plants not rush-like, the branches usually opposite or ternate; inflorescences of more than 2 flowers; corolla pubescent inside.

Leaf margin entire or essentially so..... *R. campechiana*.

Leaf margins serrate, dentate or crenate.

Stems and their ridges glabrous or nearly so.

Stems terete or subterete.

Leaves resinous-lepidote on both sides..... *R. acuminata*.

Leaves resinous-lepidote only on lower side.

Inflorescence with fewer than ten flowers; leaves deeply incised-dentate.

R. lacinaria.

Inflorescence, except near top, with more than 10 flowers; leaves not deeply incised..... *R. coccinea*.

Stems sharply angled or if apparently terete then with prominent ridges.

Calyx lobes broadly lanceolate, 6-7 mm. long..... *R. longisepala*.

Calyx lobes ovate, less than 5 mm. long.

Calyx and leaves not resinous-lepidote.

Petioles 3-4 mm. long; peduncles more than 5 mm. long.

R. sarmentosa.

Petioles 1-2 mm. long; peduncles less than 5 mm. long.

R. chiapensis.

Calyx and leaves or one of them resinous-lepidote.

Calyx lobes not resinous-lepidote, (both sides of leaves are).

R. standleyi.

Calyx lobes resinous-lepidote.

Leaves ovate, acute or obtuse, bases truncate or rounded.

R. sarmentosa.

Leaves ovate-elliptic or ovate-lanceolate, acuminate, the base cuneate.....

R. longifolia.

Stems (at least present year's growth) and/or their ridges pubescent.

Stems terete or subterete or if apparently angulate not sharply so, the ridges inconspicuous or poorly developed.

Leaves crenate-serrate, pilose with septate hairs below; calyx lobes 5-7 mm. long.....

R. rugosa.

Leaves sharply serrate, all parts pubescent with gland-tipped hairs; calyx lobes 8-10 mm. long.....

R. steyermarkii.

Stems sharply 4-10-angled, or if apparently subterete then the ridges prominent.

Leaves not resinous-lepidote.....

R. chiapensis.

Leaves, at least the younger ones, resinous-lepidote on both sides.

Leaves on the main stem more than 3 cm. long.....

R. sarmentosa.

Leaves on the main stem 2.5 cm. long or less.....

R. parvifolia.

Russelia acuminata Carlson, Fieldiana, Bot. 29: 248, fig. 1. 1957.

Open slopes and cliffs (type from Gorge of Río Samalá, Quezaltenango, Skutch 951), 1,200-2,000 m.; Suchitepéquez; San Marcos; Quezaltenango. Endemic.

Plant suffruticose, 2-5 m. long, scrambling or drooping from cliffs; stems subterete or with 4-6 angles slightly ridged, glabrous, not resinous lepidote; leaves opposite or ternate, the blades 6-9 cm. long, 3-4.5 cm. broad, ovate-lanceolate, cuneate to acute at base, acuminate-attenuate at apex, crenate-serrate, more resinous dots on the lower than on the upper side, somewhat reticulate-veiny, minutely pubescent on the main veins, on both upper and lower sides; petioles 2-4 mm. long, pubescent, especially on upper side; inflorescences laxly cymose, with 15-25 flowers; peduncles 10-15 mm. long, glabrous, sometimes sparsely resinous-dotted; pedicels 5-7 mm. long, glabrous; bractlets linear, pubescent; sepals 3.5-4.5 mm. long, ovate with long, acuminate tips, densely resinous-dotted at base, slightly hairy at tips; corollas red, tubular, 12-16 mm. long, externally glabrous, internally densely bearded with yellow hairs on median lower lobe and at base near attachment of stamens; ventral lobes 3 mm. long, 2 mm. wide, dorsal lobe slightly emarginate, slightly shorter than the ventral; stamens 9 and 11 mm. long; staminode 0.5 mm. long; anthers oval, divaricate; pistils 12 mm. long; capsules ovoid, 4 mm. long, with beak; seeds numerous, small, black.

Russelia campechiana Standl. Contr. U. S. Nat. Herb. 23: 1309. 1924. *R. campechiana* var. *lilacina* Lundell, Wrightia 2: 62. 1960. *R. lilacina* Lundell, l. c. 3: 35. 1962.

In secondary forests, at 300 m. or less; Petén. Mexico (type from Apazote); British Honduras.

Plants suffrutescent or scandent, branching, 1.5 m. tall; stems 4-angled, ridges conspicuous, scattered short appressed hairs; internodes 2.5-7 cm. long; leaves opposite, ovate-lanceolate to ovate, 5-7 cm. long, 2.5-5.5 cm. broad, coriaceous, lustrous on upper surface, glabrous, entire, margin reflexed, apex acuminate, base rounded, minute impressed glandular dots on lower surface; petioles 7-9 mm. long, older grooved on upper side, pubescent especially at base; inflorescences toward top of stem, axillary, cymose, compact, many-flowered; bracts petiolate, like leaves but smaller; bractlets linear, pubescent; peduncles 5-10 mm. long, pedicels shorter, both pubescent; calyx lobes ovate, subulate-acuminate, the tips sometimes recurved, short hairs on costa and margin, 3.5 mm. long, no glandular dots; corolla red, tube 11-13 mm. long, dorsal lobe not notched, 3.5 by 2.5 mm., ventral lobes 3 by 1.5 mm., densely bearded with yellow hairs on inside of median lobe, especially at throat, and at base near attachment of stamens; stamens 9 and 10 mm. long, hairs dense on bases of filaments; anthers oval, divaricate; staminode 3-4 mm. long, knob on top; pistil 10.5 mm. long; capsule globose, 1 cm. long including beak; seeds small, black.

Quite distinct from the other species and anomalous in its pink or purple flowers. Dr. Lundell's var. *lilacina* is based on this color difference and presumed larger flowers.

Russelia chiapensis Lundell, Field and Lab. 13: 12. 1945.

Known only from secondary forest at Tikal, Petén, *Contreras* 5579. Mexico (Chiapas).

Plants suffruticose; stems 4-6-angled, ridged on the angles, glabrous or pubescent; internodes 3-4.5 cm. long; leaves opposite or ternate; blades chartaceous, narrowly ovate, up to 7 cm. long, 4 cm. wide, apices acute or acuminate, bases broadly cuneate or obtuse, serrate, costa and primary veins impressed above, prominent below, sparsely or densely pubescent; secondary veins reticulate, with or without resinous dots; petioles 3 mm. long or less, glabrous; calyx lobes ovate, 3-3.2 mm. long, acuminate, glabrous except for a few hairs along the keel; corollas 12-13 mm. long, barbate in tube on lower side and at base near attachment of stamens; stamens 6 and 8 mm. long; pistils 10 mm. long; capsules subglobose, 5.5 mm. long, apiculate; seeds minute, numerous.

Russelia coccinea (L.) Wettstein in Engler & Prantl, Pflanzenfam. IV, 3b: 62. 1891. *Scrophularia coccinea* L. Sp. Pl. 2: 621. 1753. *R. multiflora* Sims, Bot. Mag. 37: t. 1528. 1813. *R. coccinea* f. *stipitata* Carlson, Fieldiana, Bot. 29: 253. 1957.

Open slopes, thickets or woods from near sea level to 2,100 m.; Retalhuleu; Chimaltenango; Escuintla. Mexico. Cultivated and perhaps naturalized in West Indies, China.

Plants 3 m. tall with many stems not able to support themselves; stems to 8 mm. in diameter at base, subterete, but with narrow ridges and striations between the ridges, glabrous, internodes 8-10 cm. long; leaves opposite or verticillate, ovate-lanceolate, apices acute or acuminate, bases truncate or subcordate, serrate,

glabrous except for a few multicellular hairs on the upper side and on the veins on the lower side, many small yellowish depressed resinous dots on the lower side which make papillae on the upper side; petioles 4-5 mm. long, glabrous; inflorescences one or two from an axil, near the ends of the branches, cymose and sometimes appearing racemose, flowers numerous (15 or more); peduncles 5-8 mm. long, slightly pubescent; pedicels 3-5 mm. long, slightly pubescent; bractlets linear, pubescent, ciliate; calyx lobes ovate-lanceolate, setaceous, membranaceous, margins becoming purple, a few hairs on the midrib and tip, no resinous dots; corollas 10-12 mm. long, the upper lip slightly notched, the lower lip 3-lobed, the lobes 3 mm. long, slightly longer than the upper; flat hairs on the inner side of the median ventral lobe of the corolla, and shorter flat hairs near the attachment of the stamens; two stamens 5 mm. long, the other two 6 mm. long; anthers divaricate; staminodes small (1 mm. long); pistils 7-8 mm. long; capsules 3 mm. long, excluding beak, globose, no longer than the persistent calyx lobes; seeds 0.3 mm. long, black, embedded in hairs which fill the capsule.

Dr. Carlson's forma *stipitata* is distinguished from the species by stipitate glands in the inflorescence.

Russelia equisetiformis Schlecht. & Cham. *Linnaea* 6: 377. 1831. *R. juncea* Zucc. *Flora* 15, Beibl. 2: 99. 1832. *Lluvia de coral; lorenquenque* (fide Aguilar).

Perhaps native of Mexico and occasionally planted as an ornamental, not known in wild state but grown around the world.

Plants about 1 m. tall, suffruticose, profusely branched, rush-like (resembling *Equisetum*), with small, caducous leaves; branches verticillate below, opposite above, spreading; stems green, glabrous, 4-12-angled, with prominent ridges on angles and striations between them, upper stems very slender; internodes 5-7 cm. long; lower leaves verticillate, 3-6 in a whorl, ovate or elliptical, acute, larger ones with one or a few large teeth on each side, 8.5-15 mm. long, 6-9 mm. wide; upper leaves smaller, opposite, linear, entire, both surfaces glabrous, with few circular resinous dots, veins not prominent; petioles 3-4 mm. long, often remaining appressed to stem when leaves fall; inflorescences near top of plant, opposite or verticillate, 1-2-flowered; bractlets small, linear, with few resinous dots; peduncles 3-4 cm. long, pedicels 1-1.5 cm. long, both slender, glabrous; calyx lobes broadly ovate, acute or mucronate, 2-3 mm. long, glabrous, no resinous dots, not spreading; corollas red, 1.5-2.5 cm. long, outer surface glabrous, dorsal lobe deeply notched, 3 ventral lobes about the same length as dorsal; stamens to 18 and 20 mm. long, extending to mouth of corolla tube, without hairs on filaments; anthers orbicular, divaricate, or somewhat pendulous; staminodes very short (0.5-0.7 mm.); pistils 18 mm. long; style apiculate; capsules globose, 3-6 mm. in diameter; persistent calyx covers lower third of capsule; persistent style to 15 mm. long; seeds small, oval, warty, light brown, among white hairs which fill the capsule.

Russelia laciniata Standl. & Steyermark. *Field Mus. Bot.* 22: 379. 1940.

Open slopes, 1,300–1,500 m., San Marcos (known only from the type, *Steyermark 37982*).

Plants shrubby, branching, to almost a meter tall; stems slender, terete, with striations, no ridges on older stems, very narrow ridges on younger stems, pale green, glabrous; internodes elongate, 4–5 cm. long; leaves opposite, thin, membranaceous, light grass-green on both sides, 5–8 cm. long, 2–5 cm. wide, ovate or rhombic ovate, acuminate or long acuminate, base wide-cuneate or subrotund, margin deeply incised-dentate, the teeth triangular, sharp acuminate, the tips somewhat recurved, veins prominent, especially on the lower side, few small, resinous dots on lower side, none on the upper; petioles less than 2 mm. long, minutely pilose or puberulent, remaining and somewhat spreading after the blades fall, giving the stem a nodose appearance; inflorescence axillary, few-flowered; peduncles 8–10 mm. long, pedicels the same or longer, both glabrous; calyx lobes 4–7 mm. long, lanceolate or ovate, cuspidate-acuminate, glabrous; capsule ovoid, glabrous, brown, 6 mm. long, tip a rigid beak, 3 mm. long; seeds 0.3–0.4 mm. long, light brown, reticulate ridged on surface. The corolla is not known.

The type is a poor specimen.

Russelia longifolia Carlson, Fieldiana, Bot. 29: 268, fig. 3. 1957.

Cliffs and rocky slopes; Izabal. Honduras.

Plants suffruticose, 1–1.5 m. tall; stems 4–6-angled, wings on the angles, ridges on the margins of the wings; leaves thin, membranaceous, opposite or ternate; petioles 2–3 mm. long, glabrous or slightly pubescent; blades 7–10 cm. long, 3–4 cm. wide, ovate-lanceolate or elliptic, apices long-acuminate, bases cuneate, sharply serrate, glabrous; young leaves with resinous dots on both sides, deciduous from older leaves; primary veins prominent on lower side; sometimes purple red, secondary veins finely reticulate; inflorescences cymose, 5–7-flowered; peduncles 10–12 mm. long, glabrous; pedicels 5–8 mm. long, glabrous; sepals 3–4 mm. long, ovate, apex long-acuminate, glabrous, few resinous dots at the base, ridges along the keel; corollas 12–14 mm. long, ventral lobes 2.5 mm. long, 1.5 mm. wide, dorsal lip slightly shorter, slightly emarginate, barbate along median ventral lobe and slightly so near base; stamens 8 and 10 mm. long; staminodes 3 mm. long; anthers divaricate; pistils 10–11 mm. long; capsules 3–4 mm. long, globose; seeds small, numerous.

Russelia longisepala Carlson, Fieldiana, Bot. 29: 254, fig. 2. 1957.

Open slopes, alt. 1,300 m.; Alta Verapaz (type *Tuerckheim 2249*). Endemic.

Plants suffruticose, 3–5 dm. tall; stems 4–6-angled, narrow ridges on the angles, glabrous except at ends of branches; internodes 2–5 cm. long; leaves opposite, elliptic, apices acute, bases cuneate, serrate; upper sides and veins of lower sides of younger leaves sparsely short-appressed-pubescent, lower sides sparsely resinous-lepidote; smaller veins not evident; petioles 1 mm. long, pubescent; inflorescences 2–4-flowered; bractlets long-oval; peduncles 8 mm. long, glabrous; pedicels 3–5 mm. long, glabrous; calyx lobes 6–7 mm. long, lanceolate, gradually tapering from base

to apex, margins red-purple, pubescent in narrow line along midrib; corollas 9–11 mm. long, lobes 4 mm. long, spreading, barbate on inner side of ventral lobe near mouth, not at base; stamens 7 and 8 mm. long; staminode 2 mm. long; pistils 7–8 mm. long; capsules elongate, 8 mm. long; seeds oval, brown, numerous.

Russelia parvifolia Carlson, *Fieldiana*, Bot. 29: 282, fig. 6. 1957.

Cliffs and open slopes or open forest, 1,000 m. or less; Guatemala (type *Deam 6096*); Zacapa; Santa Rosa. Endemic.

Plants suffruticose, 1–1.5 m. tall, branching; stems 4–6-angled, ridges on angles thickened, broad and flat, densely hirsute with straight multicellular hairs of unequal lengths; internodes 3–8 cm. long; leaves opposite or ternate, 1–2 cm. long, 0.8–1.5 cm. wide, broadly ovate or elliptic, apices acute or obtuse, bases truncate or widely cuneate, margins serrate or serrate-crenate, densely hirsute on both surfaces and especially on the veins on the lower side, scattered resinous-lepidote on both sides; petioles 2–4 mm. long, hirsute; inflorescences spreading, with 3–8 flowers; peduncles 4–8 mm. long, pedicels 3–4 mm. long, both densely hirsute and glandless; calyx lobes 3 mm. long, ovate, pubescent medianly and on the subulate tip, densely or sparingly resinous-lepidote; corollas tubular, slightly spreading at the mouth, 11–12 mm. long, ventral lobes 3 mm. long, 1 mm. wide, dorsal lip shorter, emarginate; corollas glabrous externally, bearded inside along median ventral lobe and at base near attachment of stamens; stamens 7 and 9 mm. long, with hairs at base of filaments; anthers oval, divaricate; staminodes 1 mm. long; pistils 8 mm. long; capsules 3 mm. long, globose; seeds numerous, minute.

Russelia rugosa Robinson, *Proc. Am. Acad.* 43: 58. 1907.

Motagua River valley near Gualan, alt. 200 m. (type, *Deam 6336*). Zacapa. Endemic.

Plants fruticose; stems terete or subterete with 4–6 very narrow inconspicuous ridges and fine striations between the ridges, pubescent with multicellular hairs of unequal lengths, at least on the stems of the current year's growth; branches slender; internodes 5–8 cm. long; leaves thin, opposite or ternate, generally rugose, 5–7 cm. long, 3–4.5 cm. wide, elliptic, apices acute or obtuse, bases cuneate, margins crenate-serrate except at the base, both surfaces pilose with few scattered, long, septate hairs, especially beneath on the veins, no resinous dots, veins slightly impressed on the upper surface, prominent and lighter colored on the lower; petioles 4–5 mm. long, pilose; inflorescences axillary, sessile, 2–3-flowered, much shorter than the leaves; peduncles lacking; pedicels slender, 4–6 mm. long, pilose; calyx lobes linear-lanceolate, 5–7 mm. long, pilose; corollas tubular, red, 11–15 mm. long, deeply cleft, lobes spreading-undulate, exterior with hairs, some gland-tipped, upper lobe cleft 1.5 mm. deep, lower lobes 3 mm. long, 2.5 mm. broad, hairs near throat on inside of ventral lobe of tube and at base near attachment of stamens, the hairs much finer and more matted than in other species; stamens 3 and 6 mm. long, with fine hairs at base; staminodes 2 mm. or more, with aborted anther; anthers oval, divaricate; pistils 7 mm. long; capsules ovoid, 4 mm. long; seeds large (0.8 mm. long), with parallel ridges running lengthwise.

Russelia sarmentosa Jacq. Enum. Pl. Carib. 25. 1760. *R. flavoviridis* Blake, Contr. U. S. Nat. Herb. 24: 22. 1922 (type from Izabal, *Blake 7790*). *R. sarmentosa* f. *eglandulata* Carlson, Fieldiana, Bot. 29: 263. 1957. *R. sarmentosa* f. *pubescens* Carlson, l.c. 264. *R. sarmentosa* f. *velutina* Carlson, l.c. 265. *Hierba militar; guillera* (fide Aguilar).

Thickets or open rocky slopes, sometimes in pine forest, 1,800 m. or less; Petén; Izabal; Zacapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Escuintla. Mexico; West Indies; British Honduras to Costa Rica and Panama; Colombia.

Weak branching shrubs to 2 m. tall, erect or procumbent, the stems 4-angled or 4-6-subulate, the flat sides striate, glabrous or variously pubescent, glandular-lepidote or not, internodes 5-13 cm. long. Leaves ovate or broadly ovate, truncate, subcordate or rounded at the base, dentate or crenate, 1.5-8 cm. long and 1-5 cm. broad, glabrous to sparsely pubescent, petioles 2-3 cm. long; inflorescence cymose, axillary, peduncles to 2 cm. long, glabrous or pubescent; calyx lobes ovate, acuminate, about 4 mm. long; corolla tubular with the lips spreading, about 10-15 mm. long, posterior lip emarginate, the anterior one trilobate, more or less pubescent within; capsules about twice as long as the calyx.

A widespread and variable species. Dr. Lundell writes (*Wrightia* 2: 63. 1960) that he has found the formae, described by Dr. Carlson, in a population at Tikal with all degrees of variation and hence that recognition of forms seems futile.

Russelia standleyi Carlson, Fieldiana, Bot. 29: 257, fig. 2. 1957.

Mountain slopes, alt. 1,400-1,800 m.; Jalapa (type *Standley 77093*). Endemic.

Plants suffruticose, 1 m. tall; main stems 6-angled, branches 4-angled, angles thickened, glabrous, yellow-green; leaves opposite or ternate; blades 1-2.5 cm. long, 8-12 mm. wide, apices acute or obtuse, bases cuneate or truncate, serrate with few large teeth, ciliate, both surfaces glabrous with few large (0.3 mm. diam.) resinous scales; veins not prominent, somewhat pubescent on lower side; petioles 2 mm. long, pubescent on upper side; inflorescences 3-5-flowered; peduncles 5-18 mm. long, glabrous; pedicels 5-7 mm. long, glabrous; calyx lobes 3 mm. long, broadly ovate at base, long acuminate at tip, glabrous, without glands, the margins purple; corollas 10-12 mm. long, barbate within on ventral lobe; stamens 9 and 10 mm. long; staminodes 1.3 mm. long, with knob at top; pistils 10 mm. long; capsules globose, 4 mm. long; seeds reticulate.

Russelia steyermarkii Carlson, Fieldiana, Bot. 29: 272, fig. 4. 1957.

Ravine or open slopes, alt. 1,200 m.; Zacapa (type *Steyermark 42980*). Endemic.

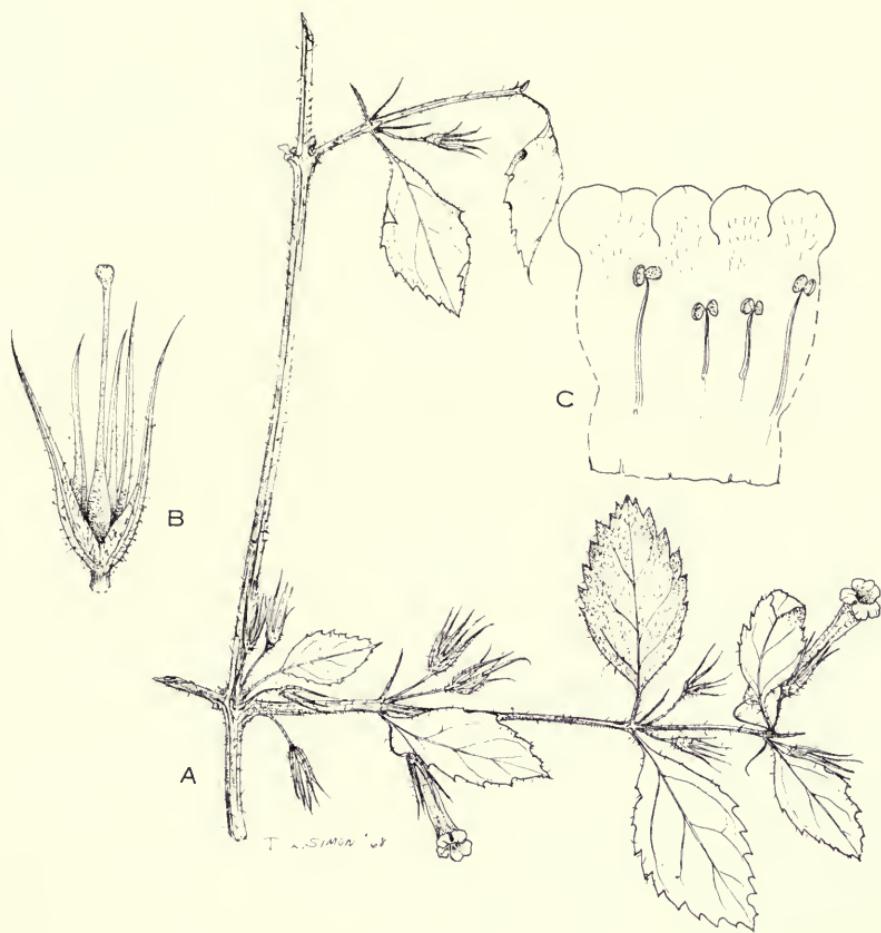


FIG. 89. *Russelia steyermarkii*. A, branch near middle of plant, $\times 1$; B, calyx with pistil, $\times 3$; C, corolla dissected showing lobation and stamens, $\times 2$.

Plants suffruticose, 1–2 m. tall; stems terete with narrow ridges and striate between the ridges; the slender lateral branches densely pubescent, the main stems less so; leaves of the lateral branches opposite or ternate, elliptic, apices usually acute, bases cuneate, margins sharply serrate except at the base, both surfaces densely covered with short gland-tipped hairs, upper surfaces, margins and veins of lower surfaces also with long appressed multicellular hairs; petioles 4–5 mm. long, with gland-tipped hairs; inflorescences axillary, sessile, 2–3-flowered; peduncles lacking; pedicels 5–10 mm. long, densely covered with gland-tipped hairs; calyx lobes lanceolate, 8–10 mm. long, densely covered with gland-tipped hairs and also with longer hairs on margins, midrib and tip; corollas red, 12–15 mm. long, usually with hairs, some gland-tipped on exterior of tube, lobes somewhat spreading; few fine, matted hairs on inside of ventral lobe and more at base near attachment of stamens; stamens 4 and 7 mm. long, the shorter attached at a higher level than the longer, fine hairs at base; staminodes 0.2 mm. long; pistils 10–11 mm. long; capsules 4 mm. long, longer than broad.

SCHISTOPHRAGMA Bentham

Small and inconspicuous annual herbs, the stems quadrangular. Leaves opposite, entire or pinnatisect; inflorescence axillary, 1-flowered, ebracteate, the peduncle very short, pedicels longer; calyx divided almost to the base, with 5 narrow, subequal lobes; corolla tubular, the limb somewhat expanded, dorsal lip emarginate, the anterior lip trilobate; anthers 4 in two subequal pairs; style dilated at the apex, entire; capsule linear, somewhat compressed and bisulcate; seeds oblong, spirally striate.

A small genus of two known species—the other from the southwestern United States. The genus has often been included in *Conobea*, from which it seems distinct. The linear capsules resemble those of some Cruciferae.

Schistophragma pusilla Benth. in DC. Prodr. 10: 392. 1846.
Conobea pusilla Benth. & Hook. ex Jackson, Index Kew. 1, fasc. 1: 596. 1893. *Stemodia siliquosa* Sessé & Mociño, Pl. Nov. Hisp. ed. 1, 98. 1887-1890, ed. 2, 91. 1893. *Hierba María*.

Open moist hillsides and moist river banks, sea level to 400 m.; Huehuetenango; Zacapa. Mexico; Honduras; Nicaragua; Colombia.

Small annual herbs, simple or much branched, to 20 cm. tall, stems quadrangular, subalate, glabrous. Leaves simple or usually pinnatisect, mostly less than 1 cm. long, the segments mostly linear, glabrous or obscurely scabrid; inflorescence axillary, 1-flowered; calyx 5-lobate, about 2-4 mm. long, divided to near the base, the lobes linear; corolla about 5-6 mm. long, violet; anthers 4, equal or didynamous, included; capsule linear, bisulcate, apiculate, about 10-15 mm. long; seeds oblong-cylindric, spirally striate, about 1 mm. long.

SCHLEGELIA Miquel

Plants terrestrial or epiphytic, woody throughout, glabrous or the young branches and inflorescences somewhat pubescent, erect or more or less scandent; leaves opposite, petiolate, coriaceous; flowers short-pedicellate, in very short and small axillary racemes or panicles; calyx cupuliform or campanulate, coriaceous, somewhat lepidote or tuberculate, irregularly and shortly 3-4-lobate, the lobes broad, obtuse or rounded; corolla subcoriaceous, tubular, the tube dilated above, the limb 5-lobate, erect, the 2 posterior lobes oblong, fornicate, the anterior lobes smaller, triangular; stamens 4, didynamous, inserted at or below the middle of the tube, included, the filaments short, the anthers oblong, sagittate, dorsifixed; staminodium present, sometimes obscure; style stout, slightly curved, equaling the corolla, the stigma bi- or trilobate; ovules numerous in each cell; capsule baccate, indehiscent, surrounded by the persistent calyx; seeds compressed, subtriangular, membranaceous-winged.

The genus is an unusual one in the Scrophulariaceae and usually has been placed in the Bignoniaceae. The genera *Dermatocalyx*, traditionally placed in the Scrophulariaceae, and *Schlegelia*, traditionally



FIG. 90. *Schistophragma pusilla*. A, habit, $\times 1$; B, flower, $\times 5$; C, a capsule, $\times 4$. *Scoparia annua*. D, habit of plant, $\times 1$; E, mature calyx with capsule, $\times 8$.

placed in the Bignoniaceae, are synonymous. The recently discovered genus *Gibsoniothamnus* is a closely allied one and is certainly Scrophulariaceae. It adds strength to our belief that *Schlegelia* also belongs here. The genus consists of about a dozen species in the neotropics.

Corolla 6–8 mm. long, white..... *S. parviflora*.
Corolla 40–50 mm. long, pinkish..... *S. silvicola*.

Schlegelia parviflora (Oerst.) Monachino, *Phytologia* 3: 103. 1949. *Dermatocalyx parviflorus* Oerst. Kjoeb. *Vidensk. Meddel.* 29. 1856. *Schlegelia cornuta* Donn.-Sm. *Bot. Gaz.* 18: 6. 1893. *S. gentlei* Lundell, *Wrightia* 4: 95. 1968 (type *Gentle* 7565 from British Honduras).

Dense, wet mixed forests, 1,600 m. or less; Quiché; Alta Verapaz; Baja Verapaz; Izabal. British Honduras; Honduras; Nicaragua; Costa Rica and Panama.

A large or small vine, sometimes a small tree, glabrous almost throughout, the young branches sometimes pubescent, the older branches ochraceous, thick, with conspicuous large lenticels, the leaf scars large and somewhat elevated; petioles about 1 cm. long, thick; leaf blades elliptic or oval, mostly 10–14 cm. long, obtuse or subacute, obtuse or rounded at the base, the veins rather conspicuous and prominent above, the lateral nerves very prominent beneath; panicles mostly 4 cm. long or shorter, the branches and pedicels glabrate or tomentulose; calyx 6 mm. long, glabrous or nearly so, usually bearing several scales or plate-like glands; corolla white, 6–8 mm. long, the small lobes purple; fruit globose, lustrous, lavender, 1 cm. or less in diameter.

Called "tietie" in British Honduras.

Schlegelia silvicola L. Wms. *Fieldiana, Bot.* 34: 126, *t. 3*. 1972.

Epiphytic vines or shrubs in the wet forest, about 1,200 m.; Suchitepéquez. Nicaragua.

Epiphytic shrubs to 2 m. tall or possibly an elongated liana in the cloud forest; stems terete, obscurely angulate, grayish, glabrous; leaves coriaceous, glabrous but obscurely glandular-punctate below at the junction of the petiole, broadly elliptic-ovate, acute or obtuse, 7–14 cm. long and 4–9 cm. broad, petiole thick and coriaceous, about 1 cm. long, leaves of a pair subequal in size; inflorescence axillary, a sessile or short pedunculate 1–5-flowered raceme, borne in the axil of leaves, the peduncles slender, puberulent, bracteolate at about the middle, mostly about 1 cm. long; calyx broadly campanulate about 10 mm. long and 7–8 mm. in diameter, glabrous or very sparsely lepidote-glandular, obscurely bilabiate with shallow sinuses and broad lobes; corolla tubular-campanulate, bilabiate, glabrous outside, about 4 cm. long, narrowed at the base to a short tube about as long as the calyx, narrowly campanulate above, the lips spreading, lobes of the posterior lip ovate-



FIG. 91. *Schlegelia silvicola*. Branch, $\times \frac{1}{2}$; bud shown anterior side to show asetivation, $\times 1\frac{3}{4}$; calyx dissected to show ovary and style, $\times 1\frac{1}{2}$; apex of style much enlarged; corolla dissected to show stamens and staminode, $\times 1\frac{1}{2}$; anthers, two views, \times about 5.

orbicular 10–12 mm. long and nearly as broad, obtuse, glabrous, anterior lip trilobate, farinaceous-pubescent on the inner surface, the lateral lobes transversely oval, about 10 mm. long, mid-lobe smaller, ovate, about 10 mm. long; stamens 4, didynamous, pair on the sini of the mid-lobe of anterior lip longest, 22–23 mm. long, the others about 15–17 mm. long, the filaments broadened and barbate at the base; staminode present, fleshy, barbate at the base, about 4 mm. long, situated opposite the posterior lip; anthers attached at the middle, the cells about 3 mm. long; style short, about 5 mm. long, stigmas 3, ovate-lanceolate, about 1 mm. long; capsule unknown.

A rare species in Central America.

SCOPARIA L.

Annual or perennial herbs, sometimes suffrutescent, commonly much branched. Leaves opposite or verticillate, dentate, somewhat pinnatifid or entire; inflorescence of single or binate pedicellate flowers in the axils of leaves; flowers small, white or yellow; calyx 4–5-parted, lobes lanceolate to ovate, one often larger than the others, imbricate; corolla subrotate, tube almost none, 4-lobate, barbate in the throat, the lobes subequal and obtuse; stamens 4, subequal, the anthers saggitate, the cells parallel or divergent; style thickened above, the stigma truncate or shallowly bifid; ovules many; capsule septicidally dehiscent, valves membranaceous, entire; seeds numerous, angulate or furrowed.

Species about 20 in tropical America, only the following in Mexico, Central America, and Panama. One species pantropical.

Sepals acute; plants low, annual, usually much branched from the base and 15 cm. high or less; corolla yellow *S. annua*.
Sepals very obtuse or rounded at the apex; plants tall, annual or more enduring, usually 60–100 cm. high or larger; corolla white *S. dulcis*.

Scoparia annua Schlecht. & Cham. *Linnaea* 6: 375. 1831.

Moist thickets, on plains or hillsides, sometimes on sandbars, 400–1,000 m.; El Progreso; Jalapa; Jutiapa. Mexico; El Salvador; Honduras; Nicaragua.

An erect annual, commonly 10–15 cm. high, sometimes somewhat larger, usually much branched, especially from the base, glabrous, the stems angulate; leaves 1.5 cm. long or shorter, the lower ones rhombic-ovate and more or less pinnatifid, the upper ones oblanceolate, crenate-dentate or subentire, attenuate or cuneate at the base, conspicuously punctate-glandular beneath; pedicels filiform, often longer than the leaves; calyx 2.5 mm. long, the sepals lance-oblong, acute; corolla scarcely exceeding the sepals, yellow; capsule ovoid-ellipsoid, scarcely 3 mm. long.

A very small and inconspicuous plant, uncommon in Central America, but possibly overlooked.

Scoparia dulcis L. Sp. Pl. 116. 1753. *Escobeta; mastuerzo* (Petén).

Most thickets or along sandy stream beds, abundant in waste or cultivated ground, frequent about dwellings, 800 m. or less; Petén; Alta Verapaz; Izabal; El Progreso; Zacapa; Chiquimula; Santa Rosa; Guatemala; Escuintla; Suchitepéquez; Retalhuleu; San Marcos; doubtless in all the Pacific coast departments. Southern United States; Mexico; British Honduras to El Salvador and Panama; West Indies; South America; Old World tropics.

Plants annual but sometimes persisting for more than a year, erect, mostly 50–100 cm. high, often slightly woody below, sparsely pubescent or almost glabrous, usually much branched, the stems 4–5-angulate; leaves linear-oblanceolate to oblanceolate-ovate, mostly 3 cm. long or less, opposite or 3–4-nate, serrate or the uppermost entire, acute, cuneate at the base, glandular punctate; inflorescence axillary, of 1–2 pedicellate flowers in leaf axils, pedicels filiform, equaling or shorter than the leaves; sepals oblong-ovate to oval, rounded or very obtuse at the apex, 1.5–2 mm. long, often ciliate; corolla white, 3–4 mm. broad, densely white-barbate in the throat; capsule ovoid-globose, slightly longer than the sepals.

Called "anise-seed bush" in British Honduras; "escobilla" (Honduras); "culantrillo," "culantro," "culantro montés" (El Salvador). This is one of the half dozen commonest weeds of Central America, and may be found almost anywhere in the lowlands. The bushy stems are much used to make temporary brooms for sweeping floors, and there is a belief that they destroy fleas. In the Panama Canal Zone the West Indians place bunches of the branches in containers of drinking water, and claim that the water is thus kept cool, as if iced.

SIBTHORPIA L.

Prostrate or creeping, perennial herbs, rooting at the nodes, with elongate stems, villous; leaves alternate or fasciculate, long-petiolate, orbicular-reniform, coarsely crenate, or incised-pinnatifid; pedicels axillary, solitary or fasciculate, ebracteolate, the flowers almost minute, yellow, pink, or reddish; calyx campanulate, 4–8-fid, usually 5-fid, the lobes subequal; corolla tube short, or the corolla subrotate, the lobes as many as the calyx lobes or one more, subequal, imbricate in bud, spreading in anthesis; stamens as many as the corolla lobes or one or two fewer, the filaments filiform, subequal; anthers sagittate, the cells contiguous at the apex; style capitate-stigmatose at the apex; ovules numerous; capsule membranaceous, compressed, loculicidally dehiscent; seeds few, convex dorsally, flat or concave ventrally, minutely tuberculate-rugose.

About six species, widely distributed in temperate regions or in mountains of the tropics. Probably two species occur in North America, one undescribed.



FIG. 92. *Sibthorpia repens*. A, portion of plant, $\times 1$; B, node of plant with leaves and flower, new branch, $\times 2$; C, flower, 4-merous, $\times 5$; D, calyx and pistil, 4-merous, $\times 10$.

Sibthorpia repens (Mutis ex L.) O. Kuntze, Rev. Gen. Pl. 3: 239. 1898. L. Wms. Fieldiana, Bot. 34: 127. 1972. *Willichia repens* Mutis ex L. Mant. Pl. 2: 558. 1771. *Sibthorpia pichinchensis* HBK. Nov. Gen. & Sp. Pl. 2: 390, t. 176. 1817. *Hierba culebra; lana* (Huehuetenango).

Usually in forests on moist or wet banks, often on mossy rocks or cliffs, frequently in *Cupressus* or *Alnus* forest, 1,500–4,000 m., most common at higher elevations; Jalapa; Jutiapa; Sacatepéquez; Chimaltenango; Sololá; Retalhuleu; Totonicapán; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico; El Salvador; Honduras; Costa Rica; Andes of South America.

Stems very slender, sparsely villous throughout with weak, flattened, whitish hairs, often densely villous on the leaves, the stems very slender, rooting at the nodes, sometimes 50 cm. long, often pendent from banks or cliffs; leaves orbicular-reniform, 1–3.5 cm. broad, crenate-lobulate, the lobes few or numerous, the petioles mostly much longer than the blades; calyx 2.5 mm. long, 4–5-lobate, the lobes ovate, obtuse; corolla brown-purple, pinkish, or white, 4–5 mm. broad; pedicels filiform, longer or much shorter than the leaves; capsule orbicular, about equaling the calyx, short-pilose at the apex.

A small and inconspicuous plant, often forming dense mats of leaves. In general appearance it suggests some species of the genus *Hydrocotyle* (Umbelliferae), and of the genus *Dichondra* (Convolvulaceae).

STEMODIA L.

Reference: Marcel Minod, Contribution à l'étude du genre *Stemodia* et du groupe des *Stemodiées* en Amérique. Bull. Bot. Soc. Genève II. 10: 155–252. 1918.

Herbs, sometime suffruticose, from glandular-pubescent to villous to completely glabrous. Leaves opposite or verticillate. Inflorescence of a solitary to several sessile or pedicellate flowers in the leaf axils, above often becoming a dense foliate or bracteate spike; calyx 5-lobate, the lobes equal or the adaxial one slightly larger; corolla tube cylindric, the posterior lobe exterior in bud, the anterior lip spreading, trilobate; stamens 4, didymous, included, anther cells disjunct, stipitate; style dilated at the apex, usually bilobate and sometimes geniculate; ovules numerous; capsule septicidal or loculicidal, bivalvate, the valves bifid, or 4; seeds small, striate or reticulate.

A small pantropical genus of some 40 species, about ten of these in Mexico and Central America.

Mature leaves glabrous; shrubs or suffruticose herbs.....*S. fruticosa*.
Mature leaves and stems glandular-pubescent to villous.

Leaves sessile, dilated and more or less clasping at the base, plants tall and stout; flowers sessile or nearly so.....*S. durantifolia*.



FIG. 93. *Stenodia durantifolia*. A, section from flowering stem with two normal subtending leaves, $\times \frac{1}{2}$; B, partially dissected flower to show stamens and style.

Leaves petiolate; plants slender, usually low and spreading or decumbent.

Flowers subsessile, the pedicel shorter than the calyx; corolla blue.

S. verticillata.

Flowers slender pedicellate, the pedicels often much longer than the calyx; corolla white or purplish.

Calyx 7-9 mm. long; corolla 15 mm. long or longer. *S. peduncularis*.

Calyx 4-5 mm. long; corolla less than 10 mm. long, usually much less.

Valves of the capsule very obtuse; stamens inserted at the same height on the corolla tube. *S. angulata*.

Valves of the capsule acuminate; stamens inserted at different heights on the corolla tube. *S. jorullensis*.

Stenodia angulata Oersted, Vidensk. Meddel. Kjøeb. 1853: 22. 1854.

Moist thickets, shaded or open grassy banks, cultivated fields, or often along streams or sandbars, 1,200 m. or less; Alta Verapaz; Santa Rosa; Sacatepéquez; Retalhuleu; Quezaltenango; San Marcos. Mexico; British Honduras; El Salvador; Honduras; Costa Rica; Panama.

Plants annual, often much branched, erect or procumbent, villous almost throughout with long slender white weak hairs, the stems terete or nearly so, mostly 10-20 cm. long; leaves slender petiolate, elliptic-ovate to rounded-ovate, 2 cm. long or less, obtuse, rounded to cuneate at the base, crenate and sometimes

(lower leaves) shallowly incised-lobate, glandular dotted below; pedicels filiform, longer or shorter than the leaves; sepals 4–5 mm. long, 4 of them subequal, the fifth slightly longer and broader; corolla white, often tinged with purple, twice as long as the calyx or shorter, glabrous outside; capsule slightly shorter than the sepals, rounded or very obtuse at the apex, abruptly contracted into the style, the valves very obtuse.

Stemodia durantifolia (L.) Swartz, Obs. Bot. 240. 1791.
Capraria durantifolia L. Syst. ed. 10. 1116. 1759.

Swampy meadows or bogs, sometimes at the edge of salt flats, frequent on sandbars along streams, 850 m. or less; Izabal; Petén; Zacapa; Chiquimula; El Progreso; Jutiapa; Guatemala. Mexico; British Honduras; El Salvador to Costa Rica; West Indies; South America.

Plants probably perennial, erect, viscid-pubescent almost throughout, the stems villous, stout, simple or sparsely branched, mostly 40–90 cm. high; leaves sessile, dilated at the base and subamplexicaul, mostly oblong or oblong-lanceolate, 3–8 cm. long, acute or acuminate, serrate or the upper ones narrow and bract-like and much reduced; flowers pale blue or purple, subsessile, solitary in the leaf axils or forming elongate leafy-bracted spikes; bractlets linear, shorter than the calyx; sepals 5 mm. long, lanceolate, acuminate; corolla glandular-pubescent, somewhat longer than the calyx; capsule equaling or slightly shorter than the calyx.

This is a widely distributed weedy plant of tropical America, but in Central America it is relatively infrequent, and seldom very plentiful in any locality.

Stemodia fruticosa Lundell, Contr. Univ. Mich. Herb. 4: 27. 1940; *S. glabra* Oersted, Vidensk. Meddel. 1853: 21. 1854, non Spreng. 1825; *S. hondurensis* Standl. & L. Wms. Ceiba 3: 60. 1952.

Dry rocky slopes and forests or thickets, 300–1,500 m. British Honduras (type, Gentle 2252). El Salvador; Honduras; Nicaragua; to be expected in Guatemala.

Weak shrubs or suffrutescent herbs up to 1 m. tall. Leaves ovate or rhombic-ovate, coarsely serrate above the middle, 2–7 cm. long and 1–3.5 cm. broad, petiole slender, to about 1 cm. long, blade acute or acuminate, glabrous or sparsely pilose when young; inflorescence of 1–few axillary flowers on pedicels to 2 cm. long, these obscurely puberulent; sepals linear or linear-lanceolate, acuminate, erect, hispidulous, slightly unequal, up to 12 mm. long; corolla tubular, somewhat bilabiate, about 9–16 mm. long, glandular-puberulent to glabrate outside, pilose in the throat.

To be expected in Guatemala and easily distinguished from other species in Central America by the relatively large glabrous leaves.

Stemodia jorullensis HBK. Nov. Gen. & Sp. 2: 358. 1817. *S. jorullensis* subsp. *reptans* Minod, Bull. Bot. Soc. Genève II. 10: 189, f. 14, 15. 1918.

At 300 m. or less; reported from Escuintla and Suchitépequez. Mexico; El Salvador to Panama; Cuba.

Plants annual, erect or procumbent, often much branched, the stems mostly 20 cm. long or often much shorter, villous; leaves all petiolate, rounded-ovate, to rhombic-ovate, generally 2 cm. long or shorter, obtuse, rounded to cuneate at the base, crenate and often somewhat incised, thinly villous on both surfaces, more densely so above; flowers solitary or geminate in the leaf axils, on long filiform pedicels; calyx segments about 4 mm. long, the shorter ones subulate, the fifth linear and obtuse, glandular-pilose; corolla white, 8 mm. long; stamens unequal, inserted at different heights on the corolla tube; capsule about equaling the sepals, its valves acuminate or long-acuminate.

This species seems to be poorly represented in herbaria. None of the recent Guatemalan collections seem to be referable here, but Minod reports two collections from the country.

Stemodia peduncularis Benth. in DC. Prodr. 10: 382. 1846. *Trevirania parviflora* Hook. & Arn. Bot. Beech. Voy. 302. 1840, not *Stemodia parviflora* Ait., 1812. *Dicyrta parviflora* Seem. Bot. Herald 326, t. 69. 1857. *Anetanthus parviflorus* Benth. & Hook. ex Jackson, Index. Kew. 1: 133. 1893.

Moist forest or thickets, often in pine forest, 1,800 m. or less; Alta Verapaz; Zacapa; Suchitepéquez. Southern Mexico; Honduras to Panama.

Plants suberect or procumbent, often much branched, the stems as much as 75 cm. long, slender, densely viscid-villous; leaves opposite, slender-petiolate, broadly ovate, elliptic-ovate, or rhombic-ovate, 2-3.5 cm. long, obtuse, cuneate at the base, crenate, rather densely long-pilose or villous, the under surface usually prominently dotted with small (amber or black) glands; pedicels very long, filiform, long-pilose, often longer than the leaves; sepals subequal, 7-9 mm. long, linear-subulate, densely villous; corolla pale purple or white with red-purple lines, 15 mm. long or more, sparsely villosulous outside; capsule somewhat shorter than the sepals.

Stemodia verticillata (Mill.) Sprague, Kew Bull. 211. 1921. *Erinus verticillatus* Mill. Gard. Dict. ed. 8. no. 5. 1768. *S. parviflora* Ait. Hort. Kew ed. 2. 4: 52. 1812. *Lindneria verticillata* Britton, in Britt. & Wils. Sci. Surv. Porto Rico 6: 184. 1925.

Moist fields, thickets, or roadsides, often on open banks or on sandbars along streams, frequently in waste or cultivated ground, sometimes among cobblestones in streets, 1,700 m. or less, most common at lower elevations; Petén; Alta Verapaz; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Sacatepéquez; Sololá; Suchitepéquez; Retalhuleu; Quezaltenango. Southern Mexico; British Honduras to El Salvador and Panama; West Indies; South America.

A small annual, suberect or spreading, often much branched, densely viscid-pilose or villosulous, the stems mostly 15 cm. long or shorter; leaves opposite or 3-4-nate, petiolate, broadly ovate or rounded-ovate, 7-15 mm. long, obtuse, cuneate at the base, crenate and the margins usually coriaceous-thickened; flowers axillary, on very short pedicels or subsessile; sepals linear-lanceolate, acuminate, 4 mm. long; corolla purple, about equaling the sepals; capsule subglobose, 2.5-3 mm. long.

Called "corrimiento" in El Salvador. A small and inconspicuous weed, frequent in waste ground about dwellings. The plant was found, doubtless introduced, about fumaroles on the summit of Volcán de Atitlán at 3,450 m.

TETRANEMA Bentham

Reference: Francis W. Pennell, The genus *Allophyton* of southern Mexico and Guatemala, Proc. Acad. Nat. Sci. Phila. 77: 269-272. 1925.

Low herbs, sometimes suffrutescent at the base, perennial, the stems usually very short, the plants often almost acaulescent; leaves opposite, mostly crowded near the base of the stem, narrowed to a sessile or slightly clasping base, crenate-dentate or entire; inflorescences axillary, cymose or subumbellate, simple or compound, long-pedunculate, each pedicel subtended by an inconspicuous linear bract; sepals narrow, attenuate-acuminate; corolla campanulate, glabrous, the lobes shorter than the tube, somewhat spreading, the 2 posterior lobes united almost to the apex; stamens 4, didynamous; style slender, the stigma capitate, somewhat bilobate; capsule ovoid, glabrous; seeds tetrahedral, angulate, dark brown, the testa close, minutely reticulate or foveolate.

Five species are known in southern Mexico and northern Central America. The other species were described from Chiapas and Nicaragua.

Inflorescence subumbellate *T. roseum*.
Inflorescence an open cyme.

Sepals about 5 mm. long, with long filiform tips *T. evolutum*.
Sepals about 3 mm. long, acute *T. cymosum*.

Tetranema cymosum L. Wms. Fieldiana, Bot. 34:129, fig. 1972.

Moist limestone cliff, near Escobas, Izabal (type Steyermark 39858). Endemic.

Small herbs to 20 cm. tall, the stems short and perhaps suffruticose at the base, the opposite leaves crowded at the apex of the stem. Leaves narrowly obovate, obtuse, narrowed to a broad-winged petiole at the base, 12-25 cm. long and 4-8 cm. broad, glabrous except on the margins and on the veins below pubescent with weak several-celled hairs about 0.5 mm. long, veins 6-9 pairs; inflorescence axillary, an



FIG. 94. *Tetranema cymosum*. A, habit from type specimen, $\times \frac{1}{2}$; B, inflorescence with nearly mature capsules, $\times 2$; C, calyx and pistil, $\times 5$; D, corolla dissected, $\times 4$; E, anthers, $\times 10$; F, staminodium, $\times 25$; G, hairs from the surface of the corolla, much enlarged; H, stigma, much enlarged.

open 2-8-flowered cyme borne on a long slender peduncle somewhat shorter than the subtending leaves, sparsely pubescent, bracts narrowly lanceolate, cucullate, 2-3 mm. long, pedicels slender, about 5 mm. long; calyx divided almost to the base, 5-lobate, the lobes lanceolate, acute, 2.5-3 mm. long; corolla bilabiate, white, about 1.5 cm. long, campanulate with the lips spreading, posterior lip as broad as long or broader, notched at the center, subquadrate, about 4 mm. long, anterior lip deeply trilobate, the mid-lobe elliptic-ovate, about 5-6 mm. long, lateral lobes subquadrate-ovate, about 5-6 mm. long, tube campanulate, narrowed at the base, about 9 mm. long; style filiform, about 10 mm. long; anthers 4, didynamous, inserted near base of corolla tube, filaments of short pair on the sini of posterior lip, about 5 mm. long, filaments of longer pair inserted on sini of the mid-lobe of anterior lip, anther cells explanate, each cell about 0.5 mm. long; staminode vestigial, inserted at base of corolla tube on middle sinus of posterior lip, about 0.4 mm. long; capsule near maturity ovoid, 5 mm. long; seeds irregular, subquadrate, about 0.4 mm. long.

Closely related to the other two species found in Guatemala but nearest to *T. roseum*. A minute staminode is found in this species, a structure not reported from the other species.

Tetranema evolutum Donn.-Sm. Bot. Gaz. 14: 29. 1889.
Allophyton evolutum Pennell, Proc. Acad. Nat. Sci. Phila. 77: 271. 1925.

Wet shaded banks or limestone cliffs, in mixed forest, 900-1,150 m., endemic; Alta Verapaz (type from Pansamalá, *Tuerckheim* 1218).

Plants almost acaulescent; leaves few or numerous, thin, oblanceolate or obovate-oblong, 7-20 cm. long, acute or obtuse, attenuate to the sessile base (or the petiole marginate to the base), irregularly crenate-dentate, glabrous above or sparsely villous, ciliate, puberulent beneath on the veins or almost glabrous, the nerves very conspicuous beneath in the dry state; cymes simple or compound, the peduncles shorter than the leaves, the pedicels very slender, mostly 1-2 cm. long, the flowers few; sepals linear-filiform, 6-8 mm. long; corolla bright purple, 1.5-2 cm. long, glabrous outside; capsule ellipsoid.

The plant is a rather showy and handsome one. It has been collected several times recently in Alta Verapaz.

Tetranema roseum (Mart. & Gal.) Standl. & Steyermark. Field Mus. Bot. 23: 235. 1947. *Episcia rosea* Mart. & Gal. Bull. Acad. Brux. 9, pt. 2: 39. 1842. *Tetranema mexicanum* Benth. ex Lindl. in Bot. Reg. n.s. 6: t. 52. 1843; Hooker in Curtis Bot. Mag. 70: t. 4070. 1844. *Allophyton mexicanum* Pennell, Proc. Acad. Nat. Sci. Phila. 77: 271. 1925.

In moist shaded areas from sea level to 1,200 m.; Izabal. Southern Mexico; British Honduras; Honduras.



FIG. 95. *Tetranema evolutum*. A, plant, $\times \frac{1}{2}$; B, flower, $\times 2$; C, dissected corolla, $\times 3$; D, calyx and pistil, $\times 3$.

Plants with very short, somewhat woody stems; leaves few or numerous, obovate, spatulate-obovate, or oblong-ob lanceolate, 5-20 cm. long, rounded to acute at the apex, long-attenuate to the sessile base, crenate-serrate, glabrous or nearly so, or often puberulent beneath; peduncles about equaling the leaves or often longer, the inflorescence umbelliform, several-flowered, the pedicels 5-13

mm. long, densely puberulent; sepals lanceolate or narrowly ovate, acute or acuminate, the tips not filiform, puberulent or glabrate; corolla violet with a purple throat, 1.5–2 cm. long, glabrous outside; capsule broadly ovoid, 4 mm. long.

The genus *TORENIA* is represented in Central America by a single wild species, *T. thouarsii* (Cham. & Schlecht.) Kuntze, which may be expected as a weed in Guatemala. There is probably in cultivation *T. fournieri* Linden, a plant suggestive of *Mimulus*, with large, showy, purple and black-purple flowers. In El Salvador it is called "lazo de amor."

UROSKINNERA Lindley

Reference: Richard Evans Schultes, A synopsis of the genus *Uroskinnera*, Bot. Mus. Leafl. Harv. Univ. 9: 65–83. 1941.

Shrubs, copiously pubescent, often villous; leaves opposite, petiolate, dentate; inflorescence a terminal or axillary spike or raceme, laxly or densely flowered, flowers relatively large, short pedicellate or sessile, the pedicel bibracteolate; calyx tubular-campanulate, the 4–5 teeth short; corolla tube elongate, dilated above, the limb spreading, 5-parted, the lobes plane, slightly unequal, the 2 posterior lobes outermost in bud; stamens 4, didynamous, included, the filaments filiform; anther cells divergent, confluent at the apex; staminode linear-clavate, shorter or longer than the stamens; style elongate, stigmatose at the apex, shallowly or deeply bifid; ovules numerous; capsule globose, included in the calyx or nearly so, loculicidally dehiscent, the valves entire; seeds numerous, small, scrobiculate.

Four species are recorded for the genus but two of these reported from Guatemala are almost certainly synonymous. The known range of the genus is southern Mexico (Oaxaca and Tabasco) and Guatemala. It was named by Lindley for George Ure Skinner, an English merchant who went to Guatemala in 1831 and remained in that country for 35 years—that is, except for time spent in travel between America and Europe, for he is said to have crossed the sea 29 times, a real undertaking in those days. Skinner was much interested in natural history, especially orchids, and introduced more than 100 Guatemalan ones into cultivation in England. The junior author has in his library a copy of Lindley's *Folia Orchidaceae*, the original binding of which indicated that it was from Skinner's library and may have been given to Skinner by Lindley, who described the genus *Uroskinnera*.

***Uroskinnera spectabilis* Lindl.** Gard. Chron. 36. 1857; Hook. Bot. Mag. 83: t. 5009. 1857; Lem. Fl. Serres II. 4: t. 1433. 1861. *U. watsonii* R. E. Schultes, Bot. Mus. Leafl. Harv. Univ. 9: 77, figs. 1–3. 1941.



FIG. 96. *Uroskinnera spectabilis*. A, habit, $\times \frac{1}{2}$; B, corolla dissected, $\times 1$; C, calyx and style, $\times 1$. (After Botanical Magazine, t. 5009, in part).

Original collection in Guatemala by Skinner, and described from material grown in England. A rare plant known definitely only from Department of Izabal, the type of *U. watsonii* (Watson 474c) from "eastern portion of Vera Paz and Chiquimula." Cultivated in tropical regions. Open pine forests, 600 m. or less. Endemic.

A shrub to about 1.5 m. tall; leaves elliptic or elliptic-oblong, 4–18 cm. long and 2.5–10 cm. broad, subacute at the apex and acute to the base, dentate or shallowly repand-dentate, rough pilose above and softly and densely pilose beneath, petioles to 8 cm. long; inflorescence racemose or subserrate, dense, many-flowered, about 6 cm. long, the pedicels 1–2 mm. long; flowers as much as 4 cm. long when fully expanded; calyx 4-dentate, cupular, 5 mm. long, white-hirsute, the linear teeth 2–3 mm. long; corolla violet-purple, glabrous outside, the lobes triangular, subacute, sparsely glandular-lepidote within; fertile stamens glabrous; stigma deeply bifid; ovary glabrous.

Handsome and showy when in flower. It has been introduced into cultivation in Europe, Java, British Guiana, and perhaps elsewhere.

VERONICA L.

Reference: Francis W. Pennell, "Veronica" in North and South America, *Rhodora* 23: 1–seq. 1921.

Annual or perennial herbs. Leaves opposite or the floral leaves alternate and often reduced to bracts; inflorescence a spicate or racemose bracteate continuation of the stem, terminal and indeterminate or axillary in opposite-leaved racemes; flowers small, purple to white, the pedicels short, ebracteate, sometimes none; calyx 4–5-lobate, the segments scarcely imbricate, the posterior lobe small or wanting; corolla tube short, the limb spreading, 5-lobate, or 4-lobate by union of posterior lobes, lateral lobes exterior in bud; stamens 2, affixed to the tube on either side of the posterior corolla lobe; anther cells divergent; style entire, subcapitate and stigmatose at the apex; capsule loculicidal, flattened contrary to the septum, usually emarginate; seeds many or few, ovate to orbicular, smooth or rugulose.

Veronica is mostly to be found in temperate regions and is abundant in the Old World. Perhaps only one *Veronica* is native in Central America, *V. peregrina* var. *xalapensis*, the others are assumed to be introductions of European species and are mostly rather unattractive weeds.

Plants perennial, with rhizomes *V. tenella*.
Plants annual, with fibrous roots.

Flowers long-pedicellate, the very slender pedicels often longer than the leaves *V. polita*.

Flowers sessile or nearly so.

Corolla white; style very short, hidden between the lobes of the capsule; plants glabrous or glandular-pubescent. *V. peregrina*.

Corolla blue; style conspicuous, almost equaling the capsule lobes; plants densely pilose with eglandular hairs. *V. arvensis*.

Veronica arvensis L. Sp. Pl. 13. 1753.

Open meadows, scarce, about 2,700 m.; Chimaltenango (region of Santa Elena, Cerro de Tecpán, *Standley 58684*); Huehuetenango. Probably native of Europe, widely naturalized in North America and elsewhere in the world.

Plants annual, densely pilose throughout, the stems creeping or procumbent, mostly 7–25 cm. long; leaves short-petiolate or the uppermost sessile, broadly ovate or oval, obtuse, rounded at the base, 5–12 mm. long, crenate; pedicels shorter than the calyx, solitary in the leaf axils; calyx lobes in fruit foliaceous, obovate or elliptic-oblong, 5–7 mm. long; corolla blue, equaling the calyx; capsule broader than long, narrowly and deeply emarginate, 3–4 mm. broad, long-ciliate on the edges.

Veronica peregrina L. Sp. Pl. 14. 1753.

Widely distributed in the United States; native or naturalized in Europe. Represented in Central America by the following variety:

Veronica peregrina var. **xalapensis** HBK. Nov. Gen. & Sp. 2: 389. 1817. *Hierba de pozo*.

Dry or moist or wet soil, in thickets, fields, waste ground, or cultivated places, sometimes among cobblestones in streets, frequent on sandbars beside streams, rarely in alpine meadows, 400–3,300 m.; Alta Verapaz; El Progreso; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Widely distributed in the United States; Mexico.

Plants annual, usually erect, simple or sparsely branched, generally 25 cm. high or less, the stems rather succulent, glandular-pubescent, at least above; leaves sessile or short-petiolate, oblong or oval to linear, mostly 2 cm. long or less, denticulate or the upper ones entire; flowers axillary, almost sessile, white, the corolla 2 mm. broad; capsule suborbicular, deeply and narrowly emarginate, 2.5 mm. long, often pubescent, slightly shorter than the calyx.

Some of the Guatemalan material is almost glabrous, as in the typical form of the species, but most of the specimens are conspicuously glandular-pubescent.

Veronica polita Fries, Novit. Fl. Suec. 63. 1819.

Moist banks or fields, sometimes a weed in cultivated ground, 1,250–2,500 m.; Alta Verapaz; Guatemala; Chimaltenango; Quezaltenango. Native of Europe and Asia, widely naturalized in the United States; also in Mexico and Costa Rica.

Plants annual, prostrate or ascending, usually much branched from the base, thinly villous throughout; leaves petiolate, the uppermost sessile, rounded-ovate,

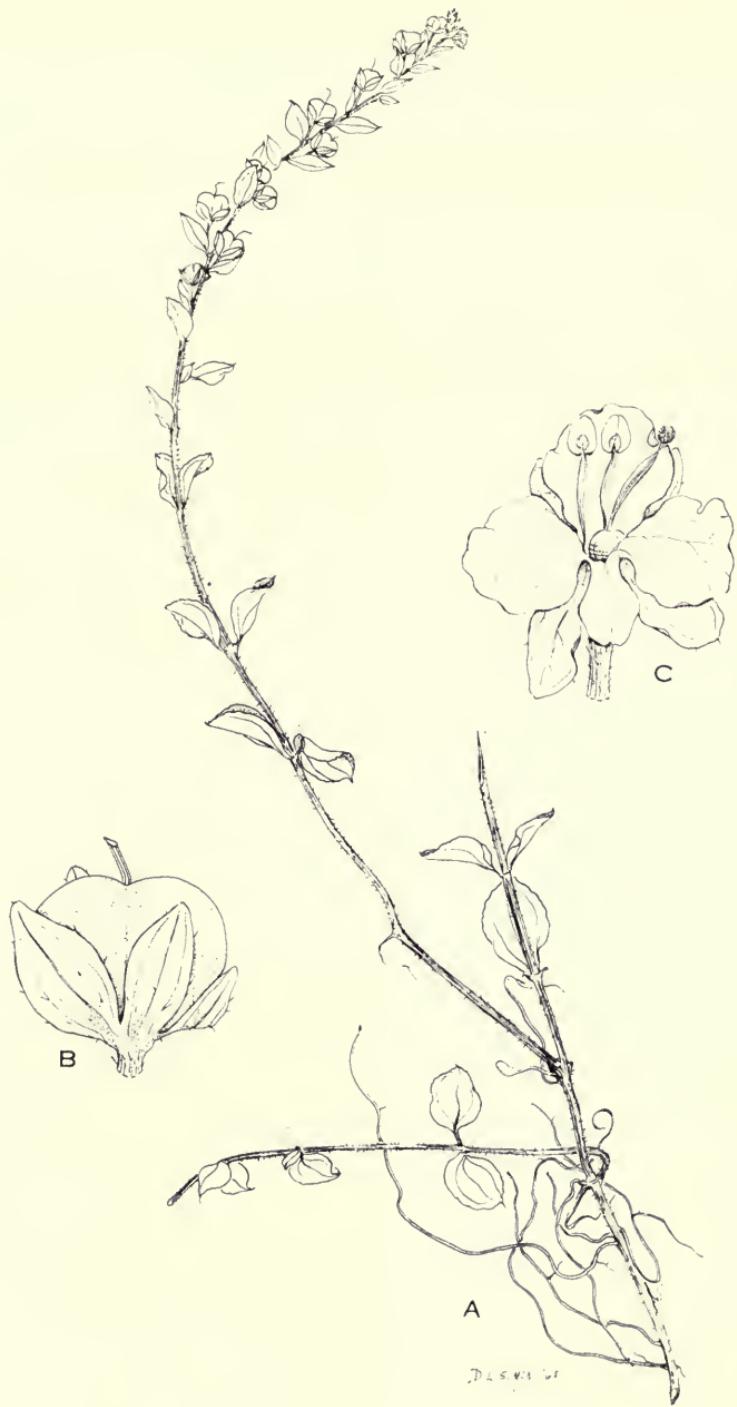


FIG. 97. *Veronica tenella*. A, habit of plant, $\times 1$; B, mature calyx and capsule, $\times 5$; C, flower, $\times 5$.

1-2 cm. long, rounded or very obtuse at the apex, rounded at the base, coarsely crenate; pedicels very slender, solitary in the leaf axils, usually equaling or exceeding the leaves; calyx lobes green, ovate, 3-4 mm. long, conspicuously nerved; corolla blue, little exceeding the calyx; capsule 7 mm. broad, bilobate, pubescent, 7 mm. broad.

This has been reported from Guatemala as *V. agrestis* L. It probably was introduced into Mexico and perhaps also into Central America long ago from Spain. It was found in Mexico by Sessé and Mociño a century and a half ago.

Veronica tenella All. Fl. Pedemont. 1: 75. 1785. *V. humifusa* Dickson, Trans. Linn. Soc. 2: 288. 1794. *V. serpyllifolia* var. *humifusa* Vahl, Enum. Pl. 1: 65. 1805.

Wet soil of alpine meadows, 3,300-3,750 m.; Huehuetenango (Sierra de los Cuchumatanes). Northern North America, south through Mexico; Andes of South America; Europe and Asia.

Plants perennial, from creeping rhizomes, puberulent or short-pilose on the stems and pedicels, the branches ascending or erect, mostly 15 cm. long or shorter; leaves opposite and petiolate or the uppermost sessile, oblong to oval or ovate, mostly 6-12 mm. long, obtuse or rounded at the apex, rounded at the base, glabrous or nearly so, crenulate or entire; flowers pale violet, with darker lines, in short narrow racemes at the ends of the stems, the pedicels equaling or longer than the calyx, usually shorter than the bracts; calyx lobes oval or elliptic, very obtuse, about equaling the capsule; corolla 3 mm. long; capsule broadly obovate, 4-5 mm. broad, puberulent at the apex.

This is probably only a form of *V. serpyllifolia*, which has a similar range and differs only in minute details of questionable importance.

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